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PAINTS, COLORS AND THEIR ANALYSIS.

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As it is quite customary in many parts of the United States that druggists are at the same time dealers in paints, colors, window glass, putty, etc., a closer examination of these articles, as to their composition, character and most frequent adulterations, will probably be of some interest to the readers of this journal.

White Paints.—In speaking of *white lead*, the following classification will be most suitable:

1. Pure white lead, a mixture of plumbic carbonate and oxyhydrate.
2. White paints, bearing the above name and containing a certain percentage of real white lead, which very often decreases to mere traces.
3. White paints, not unfrequently marked "pure white lead," but without the name of the manufacturing firm, and containing no lead whatever.

The following analysis of a sample of white lead, prepared by the Dutch method and exhibited at the Centennial Exposition in Philadelphia, may be taken as a representative of the first-class, the approximate formula derived from the analysis being $Pb_{50}C_{29}H_{86}O_{151}$.

Plumbic oxide,	83·9668 per cent.
Carbonic acid,	9·6000
Water combined,	5·8332
Moisture,	0·6000

There are chiefly two methods in use for the manufacture of white lead, viz.: the Dutch and the French process. The former consists in a slow corrosion of plates or buckles of metallic lead in pots containing a small quantity of dilute acetic acid; the basic acetate thus formed is changed into the corresponding carbonate by the action of the carbonic acid of the atmosphere, which requires several weeks' time. The French process consists in forming a basic acetate by saturating acetic

acid with plumbic oxide, and precipitating the latter by carbonic acid, prepared from lime-stone or marble dust and muriatic acid. The product of the Dutch process is a mixture of plumbic oxyhydrate and carbonate in varying proportions, that of the French process an almost pure carbonate. The gloss and brilliancy of the pigment is chiefly due to the plumbic carbonate, while the oxyhydrate increases its body. Representatives of the second class are very frequently met with in the trade, containing from 10 to 50 per cent. of "pure white lead," the remainder being substituted by oxide of zinc, plumbic sulphate, chalk, whitening, gypsum, barytes ($BaSO_4$), clay, etc.

The following "white lead" may fairly represent the third class:

Calcic carbonate,	14·800	per cent.
Zinc oxide,	60·500	
Baric sulphate,	19·400	
Silicic acid,	1·350	
Iron and alumina,	2·300	
Lime (in insoluble residue),	0·560	
Sulphuric acid (in HCl sol.),	1·710	
Plumbic oxide (as $PbSO_4$), slight trace.		
	100·620	

Insoluble residue in hydrochloric acid, 21·50 to 21·57 per cent.

It is evident that this latter "white lead" was prepared by mixing and grinding together whitening 15, barytes 25 and zinc white 60 parts. Silicic acid, iron, alumina and the insoluble portion of lime are frequent impurities in barytes. Plumbic oxide is very often found in commercial *zincs*, in quantities varying from one-half to 10 per cent., as we will see later. As the term "white lead" has become almost synonymous with "white paint," it will suffice to state that numerous combinations and mixtures of all the white pigments mentioned, are sold partly as liquid, or ready mixed paints, or brought in the market as dry colors in form of powder or ground in oil. In the following I add a few analyses of "zincs," as they are found in our present market:

1. *Sample.*

Very fine white, best quality.

Moisture,	0·4 per cent.	Zinc oxide,	99·1720 per cent.
Sulphuric acid,	0·0122	Sulphate zinc,	0·0243
Zinc oxide,	99·4	Sulphite zinc,	0·3870
Sulphurous acid,	0·1711	Moisture,	0·4000
	99·9833		99·9833

Contained traces of iron.

2. *Sample.*		3. *Sample.*	
Zinc oxide (uncombined),	98·298 per cent.	Moisture,	0·686 per cent.
Zinc oxide (combined),	0·270	Sulphurous acid,	0·627
Sulphuric acid,	0·375	Sulphuric acid,	4·656
Sulphurous acid,	0·122	Plumbic oxide,	5·453
Lime (as sulphate),	0·123	Zinc oxide,	88·254
Trace of iron,		Lime and iron, trace.	
	99·188		99·676

5·453 per cent. PbO is equal to 7·41 per cent. $PbSO_4$, and of the sulphurous acid 0·1125 per cent. was combined, and 0·5145 per cent. mechanically absorbed.

Lime, gypsum, plumbic sulphate and sulphurous acid are accidental impurities due to the process of manufacture and depending also on the quality of the ore from which the zinc-white is directly prepared. In some of the samples—particularly in moist ones—the larger portion of the sulphurous acid is merely mechanically absorbed or enclosed, and can be expelled with the moisture by heating on the water bath. In the course of time, however, zinc sulphite, $ZnSO_3$, is formed, which, finally, is converted into zinc sulphate $ZnSO_4$. If such "zincs" containing sulphuric acid are used for the adulteration of white lead, plumbic sulphate is formed, which may considerably alter the quality of the paint. A patent white paint, said to be manfactured by precipitating zinc sulphate with baric sulphite, analyzed as follows:

Baric sulphate,	60·83 per cent.
Zinc sulphite,	32·28
Zinc oxide,	6·88
	99·99

That "pure zincs," like "white lead," are sometimes adulterated, may be illustrated by the following analysis:

Baric sulphate,	54·200 per cent.
Zinc oxide,	44·300
Sulphuric acid,	0·788
Lead, lime and alumina,	traces.
	99·288

It is evident that the practical working formula for making this zinc-white was: barytes, 55 and zinc (ZnO), 45 parts. Besides the brands mentioned there are numerous white paints perfectly free from lead and zinc, consisting of mixtures of China clay, barytes, whitening, etc.

Blue Colors and Paints.—The most prominent pigments of this

class, which are extensively used in the arts and manufactures, are ultramarine and Prussian blue. The former is a combination of sodic sulphide with alumina silicate. Lapis lazuli, the native ultramarine, is a very beautiful, though rare mineral, and resists the action af acetic acid and alum, while the artificial product is more or less acted on by these chemicals, and entirely destroyed by strong mineral acids, with evolution of sulph-hydric gas. There are several shades of ultramarine in the market, viz.:

a. Green or bluish-green ultramarines.
b. Light blue shades of great intensity.
c. Pure deep blue shades.
d. Reddish or violet ultramarines.

They all have qualitatively the same composition, merely differing in the percentage of sulphur and oxygen, and are most generally manufactured by ignition of a mixture of China clay, sodic sulphate and charcoal. The product is green, and is sometimes brought into the market after grinding, washing and drying. On mixing this green powder with sulphur, and heating till the latter burns out, forming sulphurous anhydrid, a light-blue shade is obtained, containing from 6 to 8 per cent. of sulphur.

Beautiful deep blue shades are formed by addition of sodic carbonate and sulphur to the charge previously mentioned, and subsequent reheating with sulphur. The product of this process contains from 10 to 12 per cent. of sulphur. Mixtures of China clay, infusorial earth, coal, sodic carbonate and sulphur yield reddish-blue and violet shades on ignition.

The more silica an ultramarine contains the better it resists the acids. These pigments are extensively used in fresco painting.

As to Prussian blue—ferrocyanide of iron—I refer to my article on "Wash-Blue and its Analysis," in the "American Journal of Pharmacy," Feb., 1877. The lighter shades of blue are obtained by grinding white pigments, as chalk, whitening, barytes, zinc, clay, etc., with a certain quantity of pure Prussian or Chinese blue. It is astonishing what an immense colorific power this pigment possesses, particularly if very finely distributed.

The following experiment, which may be worth while trying, proves the latter assertion. Take 9·6 grams of whitening and 0·4 of pure blue. After mixing them in a mortar and rubbing with a pestle for

awhile, take a sample of the mixture, while the remainder is treated in the above-mentioned manner for about half an hour longer. The mixture now exhibits a far deeper shade than the sample previously taken, with which it corresponds in composition, so that the uninitiated will hardly believe that both are formed from the same constituents, in the same proportion. 1 per cent., even ½ per cent., of blue with 99 to 99½ per cent. of whitening or "zinc" (ZnO) will yet form a fine sky, or celestial, blue, as some manufacturers prefer to call it. Everybody has seen those blue-painted barrels in which coal oil is shipped. An analysis of said paint gave the following result:

Calcic carbonate,	59·032 per cent.
Sulphuric acid,	0·583
Ferric oxide (from blue),	2·200
Volatile portion of the blue,	2·200
Zinc oxide,	36.120
Lead,	trace
	100·135

The white paint of the lid of these barrels analyzes as follows:

Sulphuric acid,	12·546 per cent.
Lime (as sulphate),	9·068
Zinc oxide,	78·500
Traces of alumina.	
	100·114

This paint had been ground in oil, which was eliminated by ignition; the calcic sulphate, $CaSO_4$, therefore, is to be calculated as gypsum, $CaSO_4+2H_2O$, which approximately leads to the following working formula: Gypsum $(CaSO_4+2H_2O) = 25$, and zinc white $(ZnO) =$ 75 per cent.

The following analyses of "coal oil" blues of different make show that they all contain about 4 per cent. of the blue pigment, and solely differ in quality and quantity of the white admixtures:

Ferric oxide (from blue),	2·023 per cent.
Volatile portion of blue,	2·023
Carbonic acid,	25·232
Silicic acid,	0·269
Sulphuric acid,	1·048
Lime,	35·215
Magnesia,	0·600
Plumbic oxide,	1·987
Oxide zinc,	31·538
	99·935

These results, like the preceding analysis of coal oil blue, lead to the following working formula I, while a sample made by a Pittsburg firm showed the composition II.

	I.	II.
Whitening,	60 per cent.	46 per cent.
Zinc white,	36	50
Prussian blue,	4	4

Yellow Paints.—Plumbic chromate is the most prominent coloring constituent of these paints. Light shades, as "canary," "lemon," etc., are obtained either by admixture of white substances on grinding, as previously mentioned, or, for finer brands, by precipitating the lead solution (nitrate, in some cases acetate) by mixtures of potassic bichromate and alum solutions, thus producing mixed precipitates of very finely divided plumbic sulphate and chromate, which afterwards can be further "thinned down" on grinding. The more dilute the solutions the more tender and finer is the shade of the product. Acetic solutions give a deeper yellow precipitate than those of plumbic nitrate. Temperature, dilution and the mode of precipitation also exert great influence on the quality of the product, more marked in this, although generally observed in the manufacture of all colors. A sample of commercial chrome-yellow analyzed as follows:

Moisture,		0·150 per cent.
Baric sulphate,		47·050
Plumbic sulphate,		7·205
Plumbic chromate,		45·849
Gypsum,	traces	
		100·254

Orange shades are obtained by boiling the yellow precipitate with caustic soda, whereby a basic chromate is formed. Other inorganic yellow pigments, as baric chromate, cadmium sulphide, arsenic sulphide, etc., have but very limited application, the latter on account of its poisonous qualities.

Red Paints.—Vermillion, or mercuric sulphide, and chrome-red, or so-called American vermillion, a very basic plumbic chromate, are extensively used in painting, the latter for agricultural implements, the carriages of fire-engines, etc.

Vermillion is prepared by shaking mercury in iron flasks with solutions of alkali-polysulphurets, or caustic soda, and flowers of sulphur. The shaking is done by machinery, and lasts for several hours, when

the previously black sulphide will assume a beautiful red color. The quicker the motion the lighter and more fiery will be the shade. Its high price prevents an extensive use of this pigment in painting.

American vermillion is formed on boiling white lead with a solution of potassic bichromate. The genuine article is of a beautiful red color, which resists very well to atmospheric influences. In order to hide the decrease of intensity of this color, resulting from excessive admixture of white bodies, it is now often brought to the necessary shade by the addition of anilin dyes or corallin. The following analysis of a scarlet shows the composition of this class of paints:

Moisture,	0·250 per cent.
Organic pigment,	2·400
Baric sulphate,	46·500
Basic lead chromate,	20·093
Plumbic sulphate,	31·700
	100·943

The organic pigment was extracted with alcohol, and the beautifully colored solution left, on evaporation in a watch glass, a crystalline crust having a green metallic lustre. Further tests proved it to be corallin, soluble in alcohol and alkalies, insoluble in water. The immense colorific power of anilin dyes renders it possible to give red lead, Pb_3O_4, [1]orange mineral, $(Pb_3O_4)_x+(PbO)_y$ and even massicot, PbO, a beautiful scarlet shade. These "dyed paints" fade very rapidly when exposed to light and air, but keep well when sold in hermetically sealed tin cans, either dry or in oil.

A beautiful red pigment, consisting of antimony sulphide, Sb_2S_3, can be obtained by boiling antimony chloride with sodic hyposulphite, when an elegant reaction will take place, resulting finally as follows:

$$2SbCl_3+3Na_2S_2O_3+3H_2O=6HCl+3Na_2SO_4+Sb_2S_3.$$

E. Kopp, who first showed that the red precipitate was neither oxychloride nor oxysulphide, also communicated a practical method for its manufacture on a large scale. The by-products, sodic sulphate and hydrochloric acid, could easily be recovered, and the latter utilized again to convert the black native antimony-sulphide into the desired

[1] Orange mineral is the product of calcination of white lead, at a moderate temperature, with free admission of air. It is made from the sweepings of white lead works.

chloride necessary for this manufacture. The fact, however, that this color is readily influenced by the atmosphere, etc., has so far prevented a more extensive application.

Green Colors and Paints.—These are either green colored chemical combinations like Paris-green, Scheele's green and chromic oxide, or secondly, mixtures of blue and yellow pigments like the so-called chrome-greens, which consist of lead chromate and Berlin-blue.

Paris-green, aceto-arsenite of copper, $=C_4H_6O_4Cu+3\ (As_2O_4Cu)$ is one of the most beautiful pigments, which, however, on account of its extreme poisonous qualities, is very limitedly used in painting. It is the more astonishing, therefore, to find this very pigment often used for staining wall-paper and fancy paper for confectioners' use (see my article "Dangerous Candy," vol. 49, 1877, p. 14, of this journal). Muspratt gives the following analysis of this pigment:

Arsenious acid, As_2O_3, . .	58·65 per cent.
Cupric oxide, CuO, . .	31·29
Acetic acid, $C_2H_4O_2$, . . .	10·06

Immense quantities of Paris-green are used to kill potato-bugs. It is often adulterated with gypsum, which will be left as insoluble residue on addition of ammonia, in which the pure pigment dissolves entirely.

Scheele's Green is cupric arsenite, and also highly poisonous. It is darker and of a less bright and elegant shade than the former.

Guignet Green, chiefly consisting of chromic oxyhydrate or oxyborate, is perfectly harmless, and forms on fusing potassic bichromate with boric acid, the mass being subsequently extracted with hot water, when the pigment will be left as a beautiful green powder, which is of more importance in calico printing than in the manufacture of paints.

The most prominent representatives of the second class are the numerous shades of varying mixtures of Prussian-blue and lead chromate, which, in regard to their manufacture as well as to their analysis, are the most complicated colors in the market. Almost every color-work and, doubtless, every color-maker, pretends to have some secrets about the "greens." Very often these colors contain tartaric, oxalic or citric acid, not unfrequently all three in minute quantities, which the color-maker adds when the green precipitate has already formed, "to improve the shade." (?!) It would require too much space to dwell on the manufacture of chrome greens, and it therefore may suffice to

state that these mixtures are obtained by precipitation, so that the yellow and blue pigments meet in statu nascendi. For instance, into a large vessel containing a solution of blue in oxalic acid, lead nitrate or acetate is run in at one and potassic bichromate at the other extremity, while the contents of the vessel are constantly agitated. The lime contained in the large quantities of water used as solvents suffices to deprive the blue of its relatively small quantity of solvent, forming calcic oxalate.[1] In this case the use of oxalic acid is fully justified. Far more frequently, however, the blue is applied as a thin pulp, not dissolved in oxalic acid, which process, besides being cheaper, answers equally well. Clay, gypsum and barytes, or whatever white admixture is desired, are added to the green pulp with constant stirring, and more thoroughly incorporated by subsequent repeated grinding. Various other methods, though chiefly based on the above principles, are in use at the different works to produce different qualities and shades of chrome-greens. The following analyses may illustrate the composition of this class of paints:

Shade—Light-green, similar to Paris-green, but less fiery:

	Moisture,	0·4500 per cent.
	Loss on ignition,	3·1750
a.	Baric sulphate,	61·2200
a.	Gypsum,	0·1290
	Plumbic sulphate,	5·0000
	Zinc oxide,	0·5750
b.	Alumina,	4·0500
b.	Magnesia,	0·2736
b.	Lime,	0·5000
b.	Silicic acid,	11·2400
c.	Plumbic oxide,	7·4700
c.	Chromic acid,	3·3400
d.	Ferric oxide,	2·8000
		100·2226

a = barytes; *b* = China-clay; *c* = chrome-yellow; *d* = non-volatile portion, namely, ferric oxide of the blue, which is equal to half the quantity of pure "commercial" blue present (see "Wash-blue and its Analysis," vol. 49, 1877, p. 67, of this journal). The practical working formula, derived from this analysis, is as follows: Prussian-blue, 5·5; chrome-yellow, 11·0; barytes, 62·0; China-clay, 16·0, and plumbic sulphate, 5·5 parts—total, 100. This green also contained small quantities of tartaric and oxalic acids.

[1] An oxalic solution of Prussian-blue easily throws down the pigment when other precipitates are produced in it, as in this case, even without presence of lime or other similarly acting agent.

Another sample analyzed as follows:

	Moisture,	0·100 per cent.
a.	Loss on ignition,	2·100
	Ferric oxide,	3·100
	Calcic carbonate,	9·934
	Baric sulphate,	72·900
	Sulphuric acid (soluble in HCl),	0·802
b.	Plumbic oxide,	8·437
	Chromic acid,	3·014
		100·387

Direct estimation of carbonic acid = 4·2 per cent. *a* Prussian-blue; *b* chrome-yellow. The practical working formula for this color would be: Chrome-yellow 10, blue 5, barytes 75 and whitening 10 parts—total, 100.

This green contained, besides the constituents mentioned, also oxalic, tartaric and citric acids in minute quantities.

Brown and Black Pigments.—Quite a number of iron ores, particularly the manganiferous oxyhydrates, either raw or in the calcined state, are frequently used as paints and termed umber and burnt umber.

A number of argillaceous iron ores have found similar application and yield brown paints of great durability. Light-brown shades of leather color are produced by boiling a neutral solution of ferrous sulphate with potassic bichromate. For darker shades a small quantity of caustic soda is added, together with the bichromate. Although these precipitates are of a leather color, their application is but very limited. Cupric ferro-cyanide, doubtless one of the most handsome brown-red mineral pigments, also belongs to this class. It is rather expensive, which circumstance seems to have prevented a more general application.

The coloring principle of most of the *black* mineral pigments is carbon, as, for instance, lampblack, boneblack and graphite or plumbago. The following is an analysis of a plumbago lately found in this State, of which I happened to obtain a sample. It consists of fine leafy particles, and is of sufficient purity to find useful application in either manufacture of crucibles and paints:

Moisture,	0·26 per cent.
Ash,	8·55
Carbon,	91.19
	100·00

Some of these black pigments possess great colorific intensity and

will stand an admixture of 50 to 75 per cent. of white pulverulent substances, as, for instance, barytes, whitening, etc., without assuming a grey appearance. The different *grey* shades are obtained by mixing and grinding black pigments with large quantities of white substances as the above mentioned. Zinc dust—a by-product of the zinc distillation, the well-known reducing agent in chemistry—is also used as a grey paint. A sample of this substance, which, spontaneously ignited through the action of moisture, had the following composition (*vide* Berg und Hüttenmännische Zeitung, 1877):

Zinc,	40·0 per cent.
Lead,	2·5
Cadmium,	4·0
Zinc oxide,	50·0
Zinc carbonate and dust,	3·5
	100·0

Several samples analyzed by me contained *in toto* 63·637, 79·978, 54·727 per cent. of zinc.

It would require too much space to treat of all the numerous pigments of less commercial importance; therefore, only those have been considered which are most frequently met with in the market. Concerning the different chemicals used in the manufacture of paints it may be stated that large colorworks very often prepare their own supplies, as, for instance, acetic acid, potassic ferrocyanide, alum, copper sulphate, the different lead salts, etc. As in many instances the solutions of freshly formed compounds can at once be applied without previous evaporation and crystalization, many colors can thus be far cheaper prepared than by those concerns who buy their supplies and produce the solutions from the crystallized chemicals. A similar saving is also caused by the use of "pulps" in producing color mixtures.

Analysis of Paints.—The sample to be analyzed may be in the dry state, ground in oil or in liquid form, ready for use. In the latter cases the fatty or resinous portions of the paint are extracted with benzin, alcohol and ether, which leave the pigment in form of a powder suitable for analysis. In some cases the additions may be removed by simple ignition; however, as reductions are very apt to take place, this process recommends itself only in a limited number of cases. If a complete analysis of a liquid paint is required, whereby, not only the pigment but also the vehicle, the different oils, the quan-

tity of resinous matter, benzin and turpentine are required to be known, the *modus operandi* becomes very complicated, and a strictly correct solution of this task is in some cases impossible.

We will first consider the analysis of the dry colors, or those freed from oil by extraction, and finally dwell on the ways and means by which we may get some information on the nature of the vehicle of a paint and the quantitative relations of its constituents.

The main difficulty in these analyses consists in the separation of the different lead salts which may be present, as, for instance, plumbic sulphate and chromate from each other, and from baric sulphate and silicates (clay). We have, however, in sodic hyphosulphite an excellent solvent for plumbic sulphate, by means of which we may separate it from the above compounds. The analysis of a chrome-green, containing a blue and a yellow color, is among the most complicated ones; the analytical method most suitable in these cases may be illustrated by the recapitulation of an actual analysis.[1] Let us suppose the qualitative analysis indicated the following constituents: Plumbic chromate, ferric ferrocyanide, plumbic sulphate, calcic sulphate, zinc oxide, silicates of lime alumina and magnesia (clay), baric sulphate and moisture. The estimation of these constituents is best done in the following manner:

1 or 2 grams are used for the determination of moisture, and the dry powder is then ignited in a procelain crucible at a low heat just sufficient to destroy the ferric ferrocyanide, and reweighed to find the loss on ignition.

The calcined residue is extracted with sodic hyposulphite to dissolve the plumbic sulphate, which is subsequently precipitated with sulphuric acid, reconverted into plumbic sulphate, and finally weighed. Sodic hyphosulphite may be advantageously used in the color analysis as a test for plumbic sulphate. Plumbic carbonate is perfectly insoluble in the hyposulphite solution, while traces of gypsum and minute quantities of lead chromate—particularly of the orange and red basic chromates will dissolve—a fact which must be borne in mind when performing a quantitative analysis of a paint. The errors thus caused are, however, very slight, and of no significance for practical purposes. It is advisable, and may serve as confirmation for the correctness of a result, to

[1] For other paints, like Paris green, white lead, zincs, etc., the usual analytical rules will give satisfactory results.

weigh the insoluble residue left after extraction with hyposulphite as well as the plumbic sulphate actually dissolved and reprecipitated. The difference must be very small.

The undissolved portion is washed, and finally treated with concentrated hydrochloric acid and absolute alcohol. The result is a green solution containing the chlorides of iron, aluminum, calcium, magnesium, chromium (from chromic acid acted on by alcohol) and zinc, and a white insoluble residue consisting of lead chloride, baric sulphate and the silicates of clay. This insoluble residue is collected on a tared filter, washed with strong alcohol, dried and weighed.

The filter is re-introduced into the funnel, the residue exhausted with boiling water in which plumbic chloride will dissolve, again dried and re-weighed. The aqueous filtrate is precipitated with sulphuric acid, and from the weight of the plumbic sulphate is calculated that portion of oxide of lead which has been combined with chromic acid. Determination by loss on washing and direct estimation agree well if the manipulations have been properly conducted.

The last insoluble residue, after washing with hot water, consists of baric sulphate and clay. The quantitative analyses of it and of the alcoholic muriatic acid solution previously obtained, are performed according to the usual methods, and need no further comment.

To detect organic acids in chrome-green the following process will give satisfactory results: About 10 grams of the green powder are macerated in dilute sulphuric acid, and filtered. The clear liquid is rendered alkaline by sodium carbonate, whereby iron and chromium are partly precipitated. After acidulation with muriatic acid the sulphate is removed by the careful addition of baric chloride, after which an excess of calcic chloride and sodium acetate is added. Calcium oxalate, being insoluble in free acetic acid, is precipitated, while the tartrate and citrate remain in solution. Neutralization of the free acid precipitates the former, and, on boiling, also the latter salt.

To ascertain the relative "strength" of two colors of similar shade, the following experiment is made: Half to 1 gram of each sample is mixed with 5 to 10 times its weight of a white pulverulent substance, which exerts no chemical action on the pigment, as, for instance, baric sulphate. After sufficient mixing, the shades are compared and the darker one made equal to the light one by further addition of baric sulphate. On re-weighing the samples their weights will give the ratio of their relative "strength."

To test whether red anilin or corallin (rosolic acid) is contained in a scarlet color, it is best to extract with water. If the resulting filtrate is colored red or pink, rose-anilin is very probably present. Corallin, the more frequently used pigment for this purpose, is insoluble in water, but dissolves easily in alcohol and alkaloids. Rose-anilin and corallin (a derivate of phenol) are very easily distinguished from each other by addition of ammonic sulphide, which converts rose-anilin into colorless leukanilin, while it does not change the beautiful scarlet shade of corallin.

Sometimes a chemist is asked to determine the relation between the dry pigment and the vehicle of paints, either liquid or ground in oil. In this case a weighed quantity of the pasty or pulpy mass to be analyzed is freed from the fatty and resinous bodies by extraction with ether. The weight of the dried pulverulent residue collected on a tared filter, gives the necessary data for the information desired. In cases where the nature of the pigments will not be changed on ignition, oil and resinous matter may be destroyed by combustion, and the quantity of the dry pigment determined on re-weighing the crucible. A white paint in oil thus left 31·412 per cent. dry powder, consisting of baric sulphate, clay and calcic carbonate.

Far more difficult than these investigations is the analysis of those so-called liquid or ready-mixed paints, in case that vehicle as well as the suspended coloring matter are objects of analysis. The vehicle for paint is combined with the aim of obtaining approximately the same specific gravity as that of the pigments, so as to keep the latter suspended (most of them "settle," however, nevertheless). Among the most commonly-occurring constituents of the vehicle may be mentioned benzin, oil of turpentine, resins, linseed oil, etc.; soap, water, glue, small quantities of soda, borax or alum, besides all kinds of low-grade oils, are frequently met with. The nature of a vehicle may be approximately determined by fractional distillation; exact and reliable analytical methods are so far not known.

In the following I add such an analysis of a liquid (white) paint:

Solid incombustible white pigment obtained on extraction with benzin, ether and subsequent ignition, ...	34·405 per cent
Linseed-oil and resinous matter, . .	49·095
Oil of turpentine, ...	16·500
	100·000

No water nor benzin. (Test for water—anhydrous cupric sulphate.)

The fact that this paint began to boil at 250°F., when also distillation began, excludes the probability of the presence of the volatile petroleum benzin. A separation of oil of turpentine from the above-named hydrocarbon by fractional distillation is impossible. The oil and resinous constituents began to decompose at 350° to 400°F. on formation of acrolein.

The white pigments, of which said paint contained 34·405 per cent., analyzed as follows:

Oxide of zinc,		66·400 per cent.
Lime,		1·758
Sulphuric acid,		1·920
Clay,	14 per cent. sol.	30·300
		100·378

besides traces of lead and iron.

Probable working formula, 70 "zinc" + 30 alum-clay.

The tests for magnesia, borax, water and carbonic acid gave negative results. It is evident that in liquid paints a "cheap" vehicle will permit their sale at a low price or help to increase the profits already produced by a strongly adulterated colorific base; it is also in these very paints—not without some exceptions, however—where the "humbug" reaches its highest point of culmination.

Lake Colors.—I may be allowed to insert here a few remarks on lake colors. The numerous pigments of vegetable and animal origin show, to a certain extent, a great deal of similarity among each other, as most of them form insoluble colored compounds with alumina, which are generally termed lakes, and whereby the coloring principles of dye-woods are transferred into insoluble colored compounds, which find frequent application in paper staining, calico-printing and various other industries. Stannous chloride also forms lakes with a large number of pigments; it is, however, more expensive than the alum solutions required in the former process. One of the most beautiful lakes is undoubtedly *carmine*, an insoluble compound of the pigment contained in cochineal. There are quite a number of brands in the market, of which Carmine No. 40 is the finest. While the lower grades contain alumina, this latter one is free from it, and perfectly soluble in ammonia. From its mode of manufacture, which may be fairly termed a public secret, as well as from the fact that it leaves but very little non-aluminous ash, it may be considered an insoluble combination of

carminic acid, $C_{17}H_{18}O_{10}$, with animal matter, it being precipitated by isinglass from an acid aqueous decoction of cochineal, containing potassic bitartrate, alum and an excess of citric acid. The mother-liquor of this first precipitate, which is termed "black liquor" by the practical men, very probably on account of its beautiful "red" color, will yield a second precipitate of carmine-red, $C_{11}H_{12}O_7$, on standing for some time. The red pigments of the "black liquor" are almost perfectly precipitated by alumina *in statu nascendi.* Stannous chloride and mercury nitrate also produce scarlet precipitates, which, however, are of mere scientific interest.

Anilin and *phenol colors* in many instances show a similar affinity to alumina and stannous oxide; the only drawback to a general application of these beautiful pigments in form of lakes is their rapid fading. Quite fiery shades can also be prepared by merely immersing starch, flour or whitening in a solution of these pigments. In the French department of the Philadelphia Exposition a number of such lakes were exhibited, the base of which was said to be starch. The quality of these colors can be considerably improved by the addition of certain animal substances, as, for instance, albumen, casein, isinglass or white glue, for which these artificial pigments show a great affinity, thus effecting a more intimate union between base and pigment. This process possesses some similarity with the "animalization of cotton," in dyeing, which consists in impregnating the vegetable cotton fibre with animal matter, in order to facilitate the fixation of the dye. For corallin lakes I can recommend the following process from my own experience:

Two liters of corallin solution, containing 250 grams of corallin, rendered soluble by one pound of sal soda, are equivalently precipitated by one liter of calcic chloride, containing 200 grams $CaCl_2$. Corallin, the product of the action of nascent carbonic oxide on phenol, being soluble in alkaline carbonates, becomes deprived of its solvent on addition of calcic chloride, and will precipitate together with calcic carbonate in a state of very fine division. This precipitate may be mixed with starch or flour to produce lighter shades of scarlet. If a solution of isinglass has been added, on precipitation a small quantity of alum is added. The lake thus obtained, which is of a beautiful scarlet shade, is dried at about 150°F. It fades less readily than if prepared without addition of isinglass, which seems to prevent, at least to some extent, the formation of the light rose-colored calcic rosolate.

Black Diamond Steel Works, March 12, 1878.

OIL OF SWEET ALMONDS.

By C. E. DePuy, Ph.G.

Having noticed, while preparing unguentum aquæ rosæ, an almond-like odor, and, thinking it came from the supposed oil of sweet almonds which I was using, it led me to an examination of the article.

I observed that the oil possessed an odor resembling that of oil of bitter almonds, and, that by heating a short time, this odor disappeared and in its stead the oil had acquired a slightly rancid odor. It also soon produced quite a heavy precipitate of a white flocculent character. The oil congealed at a temperature of 15°F., and had the sp. gr. 0·945. It was insoluble in ether, soluble in two volumes of oil of turpentine and in an equal portion of chloroform, insoluble in cold alcohol of the sp. gr. 0·827, but soluble in 30 volumes of boiling alcohol of the same sp. gr.

Treated with cold HNO_3 the oil assumed a violet tinge, which soon developed into a bright yellow color. But even after long standing it neither became hard or emulsionized. The action of HNO_2 fully coroborated this test in neither solidifying the oil nor separating crystalline particles of elaidin, thus proving it to be a *drying* oil, while, on the contrary, the true oil of almonds belongs to the class of none-drying oils.

Heated with HNO_3 the oil at first changed to a dark-yellow and finally to a reddish-brown color.

With H_2SO_4 the oil at first assumed a bright yellow color, which gradually changed to a dark purple, a test which, as well as the previous one with cold HNO_3, would particularly indicate the presence of large quantities of poppy seed oil, while the reaction obtained by *heating* with HNO_3 would indicate probable admixture (though I think in a small degree) of the oil obtained from either the peach or apricot kernel, which, if present, might furnish the almond-like odor first noticed.

Chelsea, Mich., March 8th, 1878.

IMPURE MAGNESIA.

By H. C. Archibald Ph.G.

In the course of ordinary business, I had occasion to order from a wholesale druggist some heavy oxide of magnesium, for which there is

a great demand all over the city. Upon receiving the article in question, from its apparent bulk and grittiness I was induced to make a qualitative examination, which showed me that it was not a perfectly pure oxide, it dissolving with effervescence in HCl, and a precipitate forming with a solution of $BaCl_2$, insoluble in excess of HCl. A quantitative examination was made to determine the amount of CO_2 it contained, and by volumetric determination with Scheibler's apparatus the amount of CO_2 was found to be 4·14 per cent., corresponding to 7·9 $MgO.CO_2$. The amount of sulphuric acid present was found to be 1·1 per cent., equal to $MgSO_4$ 1·6 or nearly 2 per cent. Na_2SO_4, which is more than probable it was. The magnesia in question resembled in feel, and very much in appearance, the old magnesia alba of the shops, differing only in its greater density. It was not as unctuous to the feel as that prepared by Messrs. Powers & Weightman of our city, nor when taken was it near so palatable. I have been informed that the magnesia was of foreign manufacture, and was sold in good faith to the trade as being absolutely a pure oxide of magnesium of proper density, etc.

West Philadelphia, Feb. 27, 1878

QUINIA PILLS.

CAMP HALLECK, Nevada, Feb. 14, 1878.

Editor American Journal of Pharmacy:

As I have often seen formulas in various medical journals for compounding pills of quinia, none of which seem to have been satisfactory, permit me to inform you that if a small quantity of powdered gum arabic be added to the quinia and thoroughly mixed with it, and glycerin added, a few drops at a time, triturating well after each addition, it will make an excellent mass, which can be easily and leisurely worked into nice smooth and compact pills, which will remain unalterable indefinitely.

I have used the above-mentioned ingredients in the preparation of quinia pills nearly seven years, and think if they are tried perfect satisfaction will result. Yours respectfully,

JAMES E. BRETT.

REMARKS ON PILULÆ CATHARTICÆ COMPOSITÆ, THEIR INGREDIENTS, AND THE PROCESS OF COATING THEM WITH GELATIN.

BY G. H. CHAS. KLIE.

The Pharmacopœia directs to make this pill with compound extract

of colocynth, in powder, $1\frac{1}{3}$ grain; extract of jalap (in fine powder), mild chloride of mercury, of each 1 grain; gamboge, in fine powder, $\frac{1}{4}$ grain—for one=which weighs $3\frac{7}{12}$ grs. For a good and active pill, it is of primary importance to use active and pure ingredients.

The compound extract of colocynth consists of $3\frac{1}{2}$ troyounces extract of colocynth, 12 troyounces of purified aloes, 3 troyounces of resin of scammony, $1\frac{1}{2}$ troyounce of cardamom and 3 troyounces of soap, all to be finely powdered and then intimately mixed.

One of the most active ingredients in this compound extract is the extract of colocynth. The Pharmacopœia has it prepared by macerating, for four days, 48 troyounces of colocynth, deprived of the seeds, with 8 pints of dilute alcohol, expressing strongly, packing the broken up residue in a percolator, and pouring on dilute alcohol until the percolate and expressed tincture mixed together measure 16 pints. Ten pints of alcohol are to be regained by distillation, the residue dried on a water-bath and reduced to a fine powder. The last time that I prepared the extract I proceeded as follows: 48 troyounces of colocynth (not of the best quality of colocynth, the fruit being of medium size, with quite a number of small ones, and some discolored and misshapen) were deprived of the seeds and yielded 15 troyounces of pulp, which was ground tolerably fine and macerated for five days with 4 pints of alcohol, this being just sufficient for complete immersion, if the powder is pressed down. The expressed liquid measured $3\frac{1}{2}$ pints. To ascertain the strength of the tincture the alcohol was regained by distillation and the residue evaporated to dryness; it weighed 3 troyounces. The expressed mass was then broken up thoroughly and packed in a percolator. If tightly packed, it was found percolation would proceed but very slowly. The alcohol that had been recovered was properly diluted and poured on. The bulk of the colocynth in the percolator increased fully one-fourth. 5 pints of dilute alcohol, altogether, was used. When 3 pints of percolate had been obtained, percolation ceased. The mass, subjected to powerful pressure, yielded $1\frac{1}{2}$ pint more of tincture, making in all $4\frac{1}{2}$ pints. The alcohol was regained from this, and the residue was evaporated to dryness on a vapor-bath; the yield was $2\frac{1}{4}$ troyounces, making a total yield of $5\frac{1}{4}$ troyounces from 48 troyounces of colocynth, or 15 troyounces without the seed. The extract was easily pulverizable in a flat-bottomed porcelain mortar.

Mohr, in his "Commentary on the Prussian Pharmacopœia,"[1] according to which this extract is obtained by two digestions of colocynth, the first with rectified spirit, sp. gr. ·892, and the second the same diluted with an equal weight of water, says: "The yield of 15 ozs. of colocynth without seed is 2 ozs. 5¾ drs. of dry extract."

Hager, in his "Commentary to the Pharmacopœa Germanica," states that "100 parts of peeled dry colocynth, of the inferior Cyprian or the better Egyptian kind, yields, after separating the seeds, 35 and 50 parts of pulp, and of dry extract from 10 to 15 or 20 parts." According to this, the inferior would yield to 15 troyounces of seedless colocynth at the least 4·27 troyounces, and the better kind 6 troyounces of extract.

The United States Pharmacopœia says: "The extract obtained by this process weighs about 7 ozs." Comparing the weight of the products of the different processes, the Pharmacopœia claims the largest. I will not say that 7 ozs. of extract from 48 troyounces of colocynth cannot be obtained; but if the soundest and fleshiest, in short the best colocynth is not used, such a yield would seem somewhat difficult to obtain. A colocynth as just mentioned is not readily obtainable. From 48 troyounces of common colocynth, which, deprived of the seeds, weighed 16 troyounces, I have by thorough exhaustion obtained 6 troyounces of dry extract; but in this case exhaustion was carried beyond the common limit, just to ascertain how much could be extracted.

There is some difference in the menstrua of the different processes. The Pharmacopœia uses dilute alcohol, sp. gr. ·941; the Prussian Pharmacopœia directs rectified spirit, sp. gr. 0·894—0·890, and the Pharmacopœa Germanica the same, spec. grav., 0·892—0·893. I have used alcohol spec. grav. ·825, and dilute alcohol spec. grav. ·941.

Recapitulating, the yield of extract in per cent. from seedless colocynth by the several processes would be as follows:

Process,	U. S. P.	Ph. Ber.	Ph. Germ.	Own make.
Yield,	46·6	14·5	28·46 to 40·0	35·0 to 40·0 per cent.

Of the other ingredients in compound extract of colocynth, there is no difficulty in making purified aloes, and powdering it if sufficiently

[1] "Pharmacopœa Germanica," which has superseded the Prussian, has retained the same formula.—EDITOR.

dry. The resin of scammony, on account of its high price, is often adulterated. I have, off and on, heard it remarked that, by its entire omission from, it was most conspicuous in some of the compound extracts of the market. The Pharmacopœia gives tests for detection of adulteration in the resin. Cardamom, of the proper degree of fineness and purity, and a fine quality of powdered white soap, can be purchased in the market. Powdering soap is very disagreeable, if nose and mouth are not protected. The powder ought to be of the very finest quality, otherwise small specks of white soap are discernible in the finished extract.

The thorough mixing of the ingredients is accomplished by passing all through a fine sieve, then placing the powder in a bottle which it will fill one-half or two-thirds, and shaking for a minute or two. The finished extract ought to be kept in bottles, sealed, and in a cool place. If in warm weather it is kept in a common extract jar, it shows a tendency to cake. It turns several shades darker with keeping. It is infinitely superior to some extracts of the market, which often have the appearance of very coarsely ground coffee, and sometimes exhibit a decidedly burnt odor. To make a quantity of pills is one of the most tedious operations. You may commence pounding in the morning, and continue at it all through the day, and if you have a smooth, homogeneous mass by evening you are fortunate. If the exertion proves too much or too tedious, a pill mass is the result filled with smaller and larger grains of extract, which do not become pliable by any amount of subsequent rolling on the pill machine or kneading between the fingers.[1]

Following is a table showing the difference of price between purchased extract and that of own matufacture :

One pound avoirdupois (7,000 grains) of extract

	Ext. Coloc.	Pulv. Aloes.	Res. Scammon.	Pulv. Cardam.	Pulv. Sapon.	
Contains	1065·19	3652·08	913·02	456·51	913·02 grs.	= 6999·82 grs.
Costing	$ ·7307	·3392	1·565	·1141	·0773	= $ 2·8263

At the market price of $3.25, this leaves in favor of own make

[1] No difficulty whatever is experienced if the mass is made in a hot iron mortar; *very little* water should be used, and the mass rolled out while warm; or, if it has become cold and hard, it should be warmed again in an air-bath. If too much water is used, the pills will flatten on keeping.—EDITOR.

\$0.42.37. In the above, extract of colocynth was reckoned at \$0.30 an ounce, powdered aloes at \$0.65 per pound, powdered resin of scammony at \$0.75 an ounce, powdered cardamoms at \$1.75 per pound, and powdered soap at \$0.60 a pound.

The second ingredient of compound cathartic pills is pulverized extract of jalap. In the directions for the preparation of this extract the Pharmacopœia says: "Evaporate to the proper consistence," *i. e.*, to an extract of such consistence that pills may readily be formed from it. If extract of this consistence is evaporated to dryness, a troyounce will lose about 52 grains. It is very difficult to preserve the extract in the state of powder, especially in warm weather.

Mild chloride of mercury and pulverized gamboge, the two other ingredients, can be procured, of excellent quality, in the market.

The perfect round form of compound cathartic pills is somewhat difficult to preserve. In warm weather they become flat, and when kept in a bottle, where they press one on another, assume irregular shapes. This is a characteristic of the pill, which is brought about by the resin contained in extract of colocynth and jalap. When resin of jalap is substituted for the extract the pills show the same characteristic. The pills made with extracts of own make, for medicinal action can be uniformly depended upon.

Below I give a list of comparative prices of pills made with purchased extracts and extracts of own make.

The weight of one pill being $3\frac{7}{12}$ grs., the weight of five hundred pills = $1,791\frac{2}{3}$ grs., or 3 troyounces, 5 drs. $51\frac{2}{3}$ grs.

500 pills contain of:	Grains.	Cost when prepared with purchased extracts.	Cost when prepared with extracts of own make.
Compound extract of colocynth	$666\frac{2}{3}$	\$0.31 00	\$0.26.87
Extract of jalap	500	0.31.51	0.07.50
Mild chloride of mercury	500	0.06.25	0.06.25
Gamboge	125	0.01.56	0.01.56
	$1791\frac{2}{3}$	\$0.69 96	\$0.42.78

Five hundred compound cathartic pills, U. S. P., sugar-coated, cost in the market \$1.35, and gelatin-coated \$1.65. If 25 cents is allowed for sugar-coating, and 55 cents for gelatin-coating, which is a liberal allowance, the plain pills will cost \$1.10, leaving a margin of \$0.40 for the pills made with the purchased extracts, and \$0 67.82 for the pills prepared with those of own make.

Compound cathartic pills can be kept in perfect shape and therapeutic qualities unimpaired, for any length of time, by coating them with gelatin. The coating of pills with gelatin is a somewhat tedious process. As is well known, it is performed by dipping them, adjusted to the ends of needles or short wires, into a solution of gelatin, and for drying, pressing the needles or wires into soft cork or a cushion. Finally, the small, sharp edged gelatin tubes left when the wires or needles are withdrawn are cut off with small scissors, and the orifice is closed with a minute drop of gelatin solution. The mass ought to be pretty tough if the compound cathartic pills are to be immediately coated with gelatin. The adjusting, dipping, etc., of these pills occasions no more work or extra amount of precaution than any other, but while drying a difficulty occurs. Substances during the process of drying contract. The gelatin coating of pills contracts powerfully while drying. The solution of gelatin, coming in direct contact with, and remaining, at least a short time, in a semi-fluid condition, softens the surface of the pills. When the coating dries, it contracts so powerfully that it is ruptured, and a small portion of the softened mass is forced through the rupture in the form of a small bead, or one might liken it to a minute tumor. As a consequence the appearance and weight of the pills is impaired. From 30 to 50 per cent. would thus rupture. When they were first coated with an ethereal solution of mastic and then with gelatin, between 20 to 30 per cent. would rupture.

The solution of gelatin was made, in a vapor bath, of gelatin, 1 part, and water, 2 parts; one dipping was found sufficient to form a good coating. I have had occasionally to coat other pills with this solution, but have not come across any that showed the same characteristics as the compound cathartic pills. The solution of gelatin, however, was improved to an extent that the coating of only from 4 to 6 per cent. of these pills would rupture, by the addition of ½ part of pure glycerin.

During the dipping process it is advisable to keep the gelatin solution at a temperature between 140°—150°F., and to turn the dipped pills backwards and forwards and sideways, so as to distribute the solution equally, until it has slightly congealed, otherwise it will gather on the lower side of the pill in a drop, and the coating on that side will be out of all proportion to that of the other parts. When the solution has to be kept on the fire for some time it will be found necessary to add water now and then to make up for that lost by evaporation.

Lowell, N. St. Louis, Mo.

Remarks by the Editor.—In the calculations contained in the preceding paper, it seems that the items of labor and fuel have not been considered, and it appears to us very properly so, as long as the pharmacist manufactures for his own use, and without the employment of additional help can thereby advantageously turn to account hours of leisure, and utilize heat otherwise wasted.

It will be noticed that "powdered" aloes is accounted for, while the Pharmacopœia directs "purified" socotrine aloes. The purification may, at first sight, appear to be an unnecessary refinement, since impurities in that variety of aloes are not readily observable. But anyone who will undertake to purify a larger quantity of the drug will collect sufficient vegetable fragments, stones, goat skins and the like, as to induce him to change his mind. 3,342¼ lbs. of air-dry socotrine aloes, purified in different lots, lost 478½ lbs. or 13·42 per cent., a good portion of which consisted of the impurities mentioned.

In making extract of colocynth on the large scale, the separation of the seeds is a practical impossibility, and even on the small scale the operation is tedious and incomplete, the immature and shrivelled seeds at least remaining firmly imbedded in the pulp. For this reason manufacturers crush the fruit with the precaution not to break the seeds. Thus prepared and treated with the officinal menstruum, 3,460¾ lbs. of commercial colocynth of average good quality have yielded us 495½ lbs. of dry extract, equal to 14·32 per cent. The details of the different operations are now not accessible to us, but they doubtless agree closely with those of Dr. Squibb (see "Am. Jour. Phar.," 1867, p. 16), who obtained from 9951½ lbs. of colocynth 1349¼ lbs. = 13·56 per cent. of extract, the highest yield being 16·2, and the lowest, in an exceptional case, 11·3 per cent. Dr. Squibb (*Ibid.*, 1857, p. 98) also records

a yield of 20·6 per cent. from colocynth, which had been kept for three years in a dry store-room. This large yield was doubtless due to the more complete drying of the fruit. The important influence of the moisture naturally contained in drugs on the quantitative yield is often not sufficiently taken into account, but may be readily gleaned from the paper by Mr. G. W. Kennedy in "Am. Jour. Phar.," 1874, p. 174.

BENZOIC ACID IN PHARMACY.

By B. Archer.

Within the past two or three years the comparative merits of the various anti-ferments have been pretty thoroughly discussed, and the result has been to place benzoic acid first on the list. At present its use is limited to only a few officinal preparations, but there is no doubt it may be advantageously used in quite a number. In the next revision of the Pharmacopœia I would suggest, among the additions, that of benzoic acid water (gr. iv to Oi) and its substitution for water in such *syrups*, *infusions*, *decoctions* and *mixtures* as are specially prone to decomposition. The instances in which there could be objection, either chemical or therapeutical, to such substitution, would be rare, as it is harmless and will not materially affect the taste, odor or color of the preparations. While benzoic acid in the small quantity here suggested will not make *very instable* preparations *permanent*, it will so increase their stability that they may be kept as long as it is usually desired to keep them. Some have recommended salicylic acid as an antiseptic, but this will not do for general use on account of the color imparted to mixtures containing the salts of iron, and, besides, as an anti-ferment it is not the equal of benzoic acid.

I have found the benzoic acid water especially useful in preparing solutions for hypodermic use. The small vials of such solutions carried in the pockets of physicians, and thus kept at a high temperature soon undergo change unless protected by some antiseptic. It may not be out of place to say just here that physicians, who do not have daily use for their hypodermic syringes, are often annoyed by the packing becoming dry, and, consequently, so contracted that the piston will not work smoothly in the barrel. This annoyance may, to a great extent, be overcome by the addition of a few drops of glycerin to each fluidounce of hypodermic solution.

In extemporaneous pharmacy it is often more important that the diluent in mixtures should play the part of an antiseptic than that of a mere flavoring ingredient, for it is a fact well known to all observing pharmacists that many of the mixtures, emulsions, etc., dispensed by them must become unfit for use, especially in the summer months, before all is taken by the patient. In dispensing such mixtures, benzoic acid water may well replace water or the medicated waters. I have substituted benzoic acid water for water with great satisfaction in preparing solution of citrate of magnesium, mucilage and syrup of gum arabic, Jacksons' Pectoral Syrup, and many other officinal and unofficinal preparations which I need not enumerate.

The present formula is a most expeditious method of preparing syrup ipecac, but this is all that can be said in its praise. It should be changed or else that for the fluid extract so modified as to yield a handsome preparation when mixed with syrup. By adding two fluidounces of the fluid extract to one pint of benzoic acid water, filtering upon twenty-six troyounces of sugar, and making two pints of syrup when cold, a beautiful and permanent preparation is the result.

There can be no doubt of the fact that benzoic acid contributes to the preservation of cerates, ointments and all unctuous substances, but whether or not the difficulty of stability is entirely overcome by its use, and the smallest quantity necessary to accomplish it, I am not prepared to say. It has been stated that the addition of five per cent. of powdered benzoin to powdered ergot will preserve without alteration its physical and medicinal properties. Acting upon this suggestion, I added two grains of benzoic acid, dissolved in a few drops of acohol, to one ounce of powdered ergot, mixed thoroughly and spread the powder on a sheet of paper an hour or two to allow evaporation of the alcohol before bottling. Sufficient time has not yet elapsed to say whether or not the ergot is thoroughly protected by this treatment, but from its present condition there is no doubt that deterioration is at least greatly retarded.

The instability of sweetmeats, preserves, marmalades, etc., is annually a source of much annoyance to housekeepers. If sugar enough is added to prevent change during the summer months, when the jar is opened in December, they find a mass of *candied* fruit; while, if to prevent this trouble, a smaller quantity of sugar is used a few weeks of hot weather will produce lively fermentation. Four grains of benzoic

acid, dissolved in a little boiling water, added to each pound of preserves, while yet warm, will protect them without imparting any "*physicky*" taste.

Norfolk, Va.

ON A DEVICE FOR PERFORATING PLASTERS.

By Joseph P. Remington.

(*Read at the Pharmaceutical Meeting, March* 19.)

Porous plasters have been used so extensively, and their merits of furnishing external medication, whilst permitting the escape of exhalations from the skin, are so well known and appreciated that the notice of the expiration of the patent, which was circulated a few years ago, was to many pharmacists a welcome one. Since this time several manufacturers have been very industrious in increasing their lists of ready-made plasters, and now the varieties are numbered not by ten but by hundreds.

The introduction of rubber into the basis of spread plasters marked an era, and the advantages soon grew to be appreciated. First, the plaster was rendered much more flexible and, hence, more comfortable to the wearer, the stiff, often brittle combinations in use were rapidly replaced. Secondly, by a peculiar combination the plaster remained soft and could be applied to the skin without application of heat, and thus it was fair to presume that, if a plaster was adhesive at ordinary temperature of the air, it would be very apt to stick to the skin, which usually has a temperature of 98·6°F.

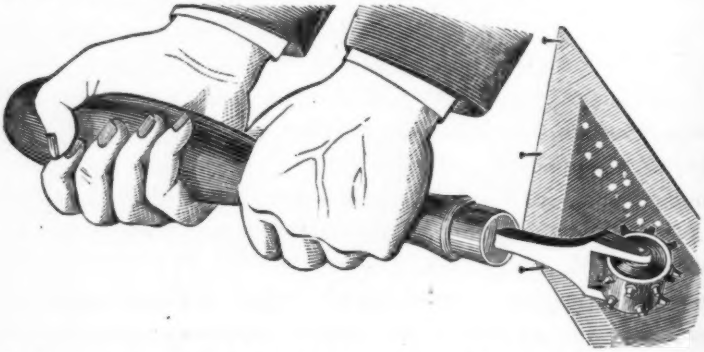
Thirdly, when to the above valuable points was added perforation, or as it is technically termed, "porousing," it was believed that perfection was attained.

One of the principal reasons for the decline in the demand for plasters spread by the apothecary has undoubtedly been the superiority of the porous plasters furnished by the manufactures on a large scale and machine-made; the patient recognized this fact and called for them—the apothecary was usually too glad to be relieved of what is almost always regarded as one of the most disagreeable duties of the shop, and hence the prosperity of the mannfacturers.

But the same causes which undermine so many industries in our country (as in others) is actively at work among the plasters. Competition, and the demand by apothecaries for cheaper products, has resulted

in depreciating the quality of the plasters furnished until *now* in the case of belladonna plaster (probably the most used), the principal manufacturers of rubber combination plasters will each furnish a plaster labeled in bold type belladonna plaster, which they will admit contains *no belladonna extract*. They do sell a higher priced plaster which professedly contains the officinal proportion—but does not *this policy* tend to sow distrust in the minds of buyers? How can a conscientious pharmacist dispense them as standard goods when he knows that plasters stamped with a lie *are* sold, and that he has no means of knowing the true from the false without an investigation, which would not occur to every one to institute, and then the facts in the case are usually reluctantly admitted.

It is owing to the lack of medicinal effect in manufactured plasters that physicians in many sections prefer to undergo the inconvenience, of the hand-made plaster, and prescribe it because they feel sure of getting what they want, and the writer has endeavored to supply one deficiency in the hand-made plaster by the following device, whereby any apothecary may *porous* the plaster which he has spread, irrespective of its size or shape or material upon which it is spread.



This device or *tool* consists of a brass cylindrical wheel, $\frac{3}{4}$ in. wide, $\frac{5}{8}$ in. in diameter, with two circular depressions turned out of each end, $\frac{1}{4}$ in. deep, leaving a hub on each end of wheel, through which a steel axle passes into the prongs of steel handle, which is driven into an ordinary tool handle 9 inches long.

The cylindrical wheel is studded with 16 punches, arranged on either side $\frac{1}{2}$ in. apart alternately; these punches are of steel, tapered and are $\frac{1}{4}$ in. long, and $\frac{1}{8}$ in. bore at the end making a $\frac{1}{8}$ in. perforation.

To operate the tool all that is necessary is to dip it first in water, then having secured the plaster firmly by tacking it to several layers of old newspapers on a rather low counter, grasp the tool tightly with both hands and drive the punches with some force through the plaster, pushing it along, *from* the operator, the wheel revolving as it is pushed forward, the little disks of plaster collect in the punches, stick together and form a core, which falls towards the axle of the wheel and is driven out by the inclined hub.

A cheaper tool could be made with but one series of punches arranged on the wheel, but two series have the advantage of doing the work more quickly, and less skill is necessary to operate it.

Hand-made plasters, spread on kid, may be perforated in this way by hand, and physicians may order any combination that they may desire, and secure one of the advantages of the machine-made plasters. The tool should be cleaned with cloth moistened with a little turpentine, and kept in a box to prevent punches from being injured by coming in contact with hard objects.

Philadelphia, Third mo. 18th, 1878.

VARIOUS NOTES.

By X. Landerer, Athens, Greece.

A Useful Bird.—A raven (Corvus fructilegus) is in the habit of burying the acorns of Quercus ægilops by the thousands to serve as food in the winter time. As the bird generally forgets where he buries them, the acorns soon germinate and grow up to stately trees, and in this way the raven contributes very materially to the welfare of hundreds of families and thereby to that of Greece, since the cups (valonia of commerce, which are much used in tanning and dyeing) represent an annual income of three to four million drachms. The name ægilops comes from aix (a goat), and opsis (eye) from a supposed resemblance of the cupula to the eye of a goat.

Heron's Fat.—A popular remedy with the Greeks and Turks is the fat from the neck of several species of heron (Ardea cinerea, egretta, etc.), which is used as an embrocation against whooping cough and scrophulous swellings. The beautiful, and, in many countries, so highly-priced plumage of those birds is thrown away, and thus one source of income neglected.

Artichokes, the unexpanded flower-buds of Cynara scolymus, *ankynaros* of the Greeks, are among the most favorite vegetables in the Orient. The juice colors the skin a beautiful reddish-brown, which color is with difficulty got rid of. The involucral scales are used for dying the hair brown, also for staining wood of a mahogany color. The name cynara is supposed to be derived from *kyon* (dog), because the scales of the anthodium are hard and pointed like the eye-teeth of a dog.

Adulteration of Ferrum Hydrogenio Reductum.—A sample offered for analysis had a blueish-black color, and, under a magnifyer, could be distinguished small light-blue grains. Boiled with liquor potassæ, cyanide of potassium was formed and red hydrated oxide of iron, thus showing that the iron in question had been prepared by insufficient ignition of ferrocyanide of iron (Prussian blue). Its proper name would be Æthiops martialis or Ferrum oxydulatum cum carbone.

Catching Fish by Poisoning Them.—Although the laws of Greece are quite severe respecting the use of poisonous substances in fishing, different species of Euphorbia are generally resorted to, occasionally also Cocculus indicus. Once a seal (Phoca vitulina) was found stupefied by feeding on poisoned fishes, and as its oil is very generally used in Greece as a substitute for cod-liver oil, it can be easily understood that the above-named practice must be considered as quite dangerous, so much the more so, as the meat of poisoned fishes easily spoils.

Pitch is collected in the Orient from Pinus maritima and Cephalonica, and is used in millions of okkas for making pitch-wine (*retsinato*, which has been in use since the time of Homeros). The collectors (*retinolektes*) are not content with making incisions through the bark, but cut deeply into the wood itself, sometimes nearly half way through the trunk. Trees mutilated in this way are destroyed in a few years and present a curious appearance, since the leaves on one side are withered and rust-colored, while on the opposite side they are still green.

Substitutes for Quinia.—Although quinia is the only reliable remedy for the chronic fevers of the Orient, its high price forbids its use among the poorer classes, and therefore several substitutes are resorted to. Physicians use often with success an extract of olive leaves and immature olives, made with diluted sulphuric acid. A popular remedy with poor people is Cayenne pepper, in doses of one to two drachm with rum or mastichonaki.

Pistacia Terebinthus.—A strong decoction of the leaves of this tree has been found very useful in albuminuria, and I have known a patient whose urine was so much loaded with albumen as to give quite a consistent milk on the addition of nitric acid; but after several weeks' persistent use of the above-named decoction, did not show even a trace of albumen. Pistacia terebinthus yields by incision Chian turpentine, and is not to be confounded with Pistacia lentiscus, which yields mastix, nor with Pistacia vera, from which come the well known pistachio nuts of the confectioners.

Adulterations.—Powdered drugs are generally imported into Greece from France, and are not unfrequently adulterated. Powdered jalap has been found mixed with various powders, amongst them with the residue from the preparation of the resin; lycopodium with over 50 per cent. pollen of pinus; cubebs with the residue from the preparation of the extract, and flavored with oil of pennyroyal; rhubarb with powdered rhapontic and other allied roots, etc.

Orobanche (grandiflora and caryophyllacea) is one of the greatest nuisances the Greeks and the Eastern people generally have to contend with, since it is a parasite and eventually destroys leguminous plants, which, particularly beans, form the staple food of these people. The ancients called all leguminous fruits *kyamos* or *orobos*, and a temple was dedicated to Apollo Kyametes. The name orobanche is derived from *orobos* (leguminous fruit), and *anchein* to choke; English *broom-rape*.

Shell-fish.—In probably few countries are there consumed in lent more shell-fish, chiefly Pinna nobilis, than in Greece. In each pinna is to be found a kind of silken appendage which in Italy is made use of by the poorer girls and women to make purses, necklaces, ear-rings, etc., and thus proves no mean source of income to hundreds of families. In Greece, on the contrary, these silken tissues are thrown away; the pearls which are occasionally found with it, however, being collected; otherwise the pinna is only used for its meat. The shell would yield excellent lime on being calcined.

Terra sigillata, T. Lemnia and T. miraculosa Saxoniæ, are argillaceous earths which were well known to the older pharmacists. The Lemnian earth is still largely used in the Orient as an absorbent, and comes in the form of troches, sometimes gilded and bearing the impression of a Turkish seal. They are much used together with a decoc-

tion of mastic as an infallible remedy in cholera infantum. Externally is applied a poultice of bread, boiled in strong red wine, and mixed with powdered aromatic herbs. These poultices are called *Krasospoma*, from krasi, wine, and psoma, bread.

Ink (melani) is generally used by the Orientals for burns and scalds. It is applied in a thick layer, and often leaves a permanent mark.

Enchantment.—To guard valuable horses against the "evil eye," a large crystal of sulphate of copper, enclosed in a silver box, is suspended from the neck of the animal. This is called *filakta*. Against bewitchings and enchantments, the stables are very generally fumigated with asafœtida, galbanum and other ill-smelling substances.

Veterinary Surgery.—Although there exist in Greece about one million horses, twelve to fifteen million sheep and goats, two million asses and mules, and so on, there is as yet no veterinary school in the country; only five or six regularly educated veterinary surgeons are to be found. Besides these there are many self-taught farriers, called albanides, whose cures very often are successful.

Falling out of hair is prevented in the Oriental countries by using an ointment consisting of the bruised fresh bulbs of Asphodelus bulbosus or of garlic, onions mixed with gunpowder. An infusion of small leaves of the lemon or orange tree in red wine has likewise proved serviceable, about twenty grains of tannin having been added to the liter of this aromatic wine.

Jaundice is cured by drinking freely of a strong decoction of the flowers of Tamarix africana (*myriki*). Some native empirics use gold (*chryson*), the Greek name for jaundice being *chrysi* (golden disease). They get a few gold pieces from the patients, put them in a yellow liquid, when, by some hocus-pocus, the gold pieces disappear, and are to be found in the pockets of these charlatans (*hekim*).

Spartium junceum (hinosparton, sparton of Dioscorides and Theophrastus) in a strong decoction, is considered a sovereign remedy for diseases of the urinary organs, particularly stone in the bladder.

Elcktron, the Greek name for amber, is probably derived from the Phenician elek, which signifies a resinous exudation. The Arabs of the present day call amber elek.

Olives of the unusually large size 2 to 2½ inches in diameter are occasionally met with. The trees, which bear only few fruits, are said to have come from the island of Rhodus.

Two new industries have, of late years, sprung up in Greece. Until recently the lees of wine (*katapatia*) were thrown away, and thus thousands of kilos of tartrates lost. In the last three or four years the lees, dried in the sun, have been exported to Italy, where they are converted into cream of tartar. This industry might be much enlarged were it not for the pernicious habit of the Greeks to "pitch" most of their wines, particularly those of the Peloponnesus, which makes the lees unsalable.

Of late the Greeks have introduced the use of bisulphide of carbon for extracting all the oil from the olives after they have been expressed. Oil extracted by this means is called *pyrenelaion*, from *pyren*, a kernel.

Change of Color of Hair.—One case has been observed where the red hair changed, two or three hours after death, to blond, and within thirty hours to gray.

Extractum Ferri Pomatum.—Owing to the scarcity, if not the absence, of sour apples in Greece, it is proposed to substitute grape juice instead, and thus make an *extractum ferri uvicum*.

Emery.—In Smyrna they use the following test for determining the quality of emery. One grain is rubbed on a previously accurately weighed glass plate with a glass pestle until no more glass is ground off. The plate is washed off, dried and weighed; the greater the difference the higher the quality of the emery.

Mineral Springs.—Visitors to mineral springs often seek dissipation rather than relief from sickness. Those who need the latter are recommended to use plenty of exercise, and, instead of most mineral waters, drink sea water in small doses, either pure or diluted with more or less fresh water, as a cheap substitute for the former, the expenses for traveling, etc., being thus also avoided.

ON the DISTINCTION of the CINCHONA ALKALOIDS.[1]

BY DR. RICHARD GODEFFROY AND C. LEDERMANN.

The price-currents of different German drug houses frequently quote several cinchona alkaloids under very different and often arbitrary names, which occasionally are well adapted to cause confusion or mistakes. Thus we find *quinidia* (or conchinin) *sulphate* quoted as chininum sulfuricum Bi, or B, or b, or β, or as chinidinum sulfuricum purum verum, etc., and *sulphate of cinchonidia* as chininum sulfuricum B or Bii, chinidinum sulfuricum, or I ma, etc.[2] To distinguish the various cinchona alkaloids from each other appears to be the more important since quinia sulphate commands a high price in the market, and an adulteration or substitution of it with the cheaper sulphates of cinchonidia and quinidia is not impossible.

The microscope alone enables us to test the purity of quinia sulphate quickly and accurately. Stoddart and F. Schrage have published some interesting information in this direction; but, since they have confined their researches only to quinia, cinchonia and quinidia, and since it is uncertain whether the latter term was intended for conchinia (quinidia) or cinchonidia, the authors deemed further researches advisable, and observed that F. Schrage must have made some statements partly incomplete and partly incorrect.

The method of microscopic examination by Stoddart and Schrage is based upon the characteristic reactions of the cinchona alkaloids with potassium sulphocyanide. For the success of the reaction there are required a concentrated solution of the potassium salt and a solution of the salt of cinchona alkaloid, saturated at the temperature existing at the time of the examination. For salts which are difficultly soluble, Schrage recommends a solution saturated at a temperature 10°C. higher than that of the atmosphere. According to the authors this is wrong, since in the manner stated microscopic pictures are obtained which are at variance with the appearance of the reaction. The preparations used by them were the pure sulphates of the four alkaloids manufactured

[1] Translated and abridged from "Archiv der Pharmacie," Dec., 1877.

[2] This confusion in the nomenclature of the cinchona alkaloids is unknown in the United States, where the nomenclature, as corrected by Pasteur's researches in 1853, has been generally adopted, and where, therefore, no excuse existed for the introduction of the term *conchinin* for quinidia, as proposed by Hesse in 1869, and now beginning to be employed in Germany.—EDITOR AM. JOUR. PHAR.

by Merk of Darmstadt. Of each a saturated aqueous solution was made, and filtered only when needed for the microscopic examination. When a drop of the filtrate is placed upon a glass slide and mixed with a drop of the solution of potassium sulphocyanide a white turbidity is at once produced, which is faintest when quinia sulphate is used. Examined under the microscope with a magnifying power of 110 diameters, the following is observed:

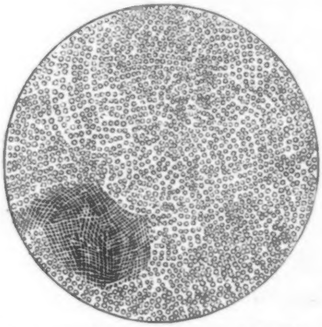


Fig. 1. Quinia Sulphate with KScy.

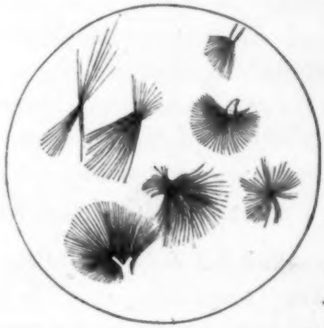


Fig. 2. Quinia sulphate.

1. *Quinia Sulphate.*—Small globules or round vesicles, which even after a day do not unite and form neither groups nor crystals (Fig. 1). Schrage described stellate groups of thin needles or spikes, which were also observed by the authors when working after Schrage's directions, but only in that portion of the liquid which had *not* become milky,

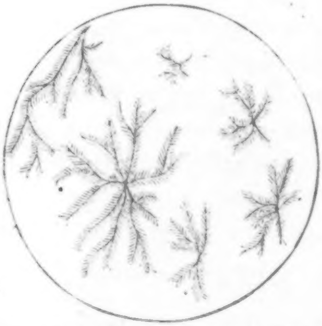


Fig. 3. Quinidia sulphate with KScy.

Fig. 4. Cinchonia sulphate with KScy.

while the latter contained only the described globules or vesicles. The stellate groups (Fig. 2) were, by comparison, recognized as quinia sul-

phate. The above minute globules were also obtained with valerianate and acetate of quinia, and in one case spike-like crystals appeared, which were due to an admixture of cinchonidia salt.

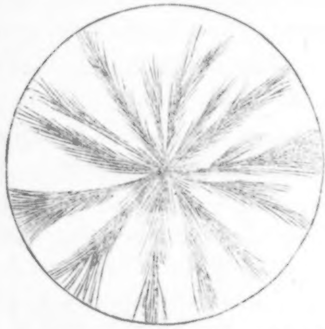


Fig. 5. Cinchonidia sulphate with KScy.

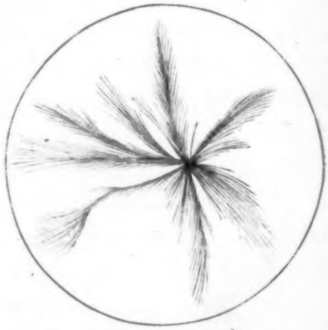


Fig. 6. Cinchonidia sulphate with KScy.

2. *Quinidia Sulphate.*—Crystals are at once observed united into striking groups (Fig. 3). They are of a brownish-yellow color in transmitted light, and in general resemble Schrage's quinidia crystals.

3. *Cinchonia Sulphate.*—Long radiating crystals, mostly considerably branched (Fig. 4), and resembling antlers or equisetum. They agree with one of Schrage's pictures, and with the other only in the presence of cinchonidia.

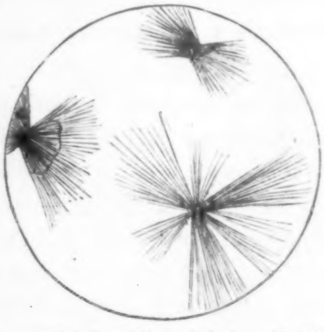


Fig. 7. Cinchonidia sulphate with KScy.

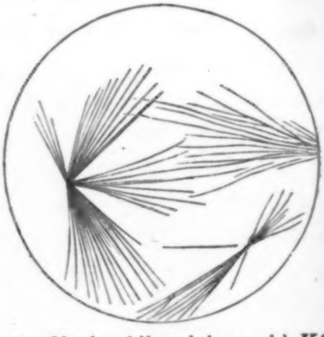


Fig. 8. Cinchonidia sulphate with KScy.

4. *Cinchonidia Sulphate.*—The crystals, which appear at once, form either dense tufts stellately arranged around a central point (Figs. 5 and 6), or uneven, thin spike-like crystals, which are united into star-like (Fig. 7) or fan-shaped (Fig. 8) groups.

By means of the microscopic examination described, the cinchona alkaloids may not only be distinguished from each other, but the difference in the crystalline form will likewise detect all impurities and adulterations; and this method is the more important as, for the latter purpose, the so-called wet way is much more tedious, though by no means superfluous.* When purchasing a quinia salt the authors recommended to dissolve about ·1 gram of it in 10 or 15 cc. of chlorine water, and add two or three drops of ammonia. If an emerald-green color is produced quinia or quinidia, or both, are present, but possibly also cinchonia or cinchonidia. The microscopic examination described gives the best results. The authors made about twenty mixtures of quinia sulphate with variable quantities of the other three alkaloids, the presence of which was in every instance revealed by the microscope.

GLEANINGS FROM THE FOREIGN JOURNALS.

By the Editor.

Preparation of Pure Scammony Resin.—E. Perret recommends to exhaust the scammony with boiling alcohol, and to neutralize the alumina and lime of the blackish liquid, which has an alkaline reaction, with a few drops of sulphuric acid, whereby a colored precipitate is obtained, leaving the supernatant liquid colorless. The clear filtrate is distilled, the residue completely dried at about 104°C. (219°F.), and, while still warm, poured upon a marble slab; when cool it is powdered and yields a white and very dry product.—*Bull. Soc. Chim. Phar.*, N. Ser. xxviii, p. 522—*Jour. de Phar. et de Chim.*, Feb., 1878, p. 120.

Suppositories Containing Extracts.—Paul Petit obtains perfect suppositories by the following method: the extract is liquified in a porcelain capsule, with a small quantity of water, and animal soap, equal in quantity to the extract, is added; the solution is evaporated at a moderate heat to a syrupy consistence, and fused together with the requisite quantity of cacao butter; the mixture is well agitated until it commences to solidify, when it is poured into well-cooled moulds. With a little care, the suppositories thus prepared, are perfectly homogeneous and uniform in color.—*Jour. Phar. d'Anvers.*, 1877, p. 300.

Soluble saccharate of iron, Ph. Ger., is rather tedious to prepare on a somewhat larger scale, the precipitation by boiling water, the settling of the precipitate and the washing, consuming much time; but when

the mixture of soda solution, ferric chloride and simple syrup is poured into three times its volume of strong alcohol, a resin-like precipitate is deposited, which is readily washed by alcohol, and converted into a dry powder with the requisite quantity of sugar.—*Archiv d. Phar.*, Jan. 1878.

Dispensing of Monobromated Camphor.—Lépage recommends to dissolve monobromated camphor in six times its weight of expressed oil of almonds, and emulsify the solution in the usual manner.—*Jour. de Phar. et de Chim*, June, 1877, p. 535.

Bibromide of Acetic Acid.—Bromine 54 grms. and glacial acetic acid 20 grms. do not react upon each other at the ordinary temperature; but in the presence of a very small quantity, 4 to 10 drops, of carbon bisulphide, the mixture becomes warm and finally congeals. The compound forms orange-colored thin needles, or thicker pale-red crystals, which fuse at about 36°C., have a pungent odor and are very deliquescent, producing a red liquid, which, by water, is decomposed into bromine and acetic acid. It is also soluble in carbon bisulphide, but more freely in chloroform, benzol, ether and alcohol; its composition is $C_2H_4O_2Br_2$.—*Ber. deutsch. Chem. Ges.*, 1877, p. 2103.

The distillation of castor oil, when carried on under a pressure diminished by the action of a water-air-pump, yields at first about one-third of its volume of an oily liquid, nearly one-half of which is *œnanthol.* On continuing the heat, the thermometer rises more than 100°C., and a crystallizing body is obtained, which appears to belong to the oleic acid group, and to have the composition $C_{11}H_{20}O_2$.—*Ibid.*

Salicylate of Zinc.—Ferdinand Vigier prepares it by mixing salicylic acid with distilled water in a porcelain capsule; the mixture is heated to boiling and small quantities of oxide of zinc added, previously diffused in a little water. The solution is readily effected and when the zinc oxide ceases to dissolve, filtered and cooled; the mother liquor is evaporated at a moderate heat, and again set aside to crystallize. If the heat of the concentrated solution is raised to boiling, a decomposition into a sparingly soluble basic zinc salicylate takes place. The contact with iron, and other metallic substances, must be scrupulously avoided.

The normal zinc salicylate occurs in glossy, satiny needless, having a sweet, somewhat styptic and bitter taste; it is very soluble in hot

water, in alcohol, ether and methylic alcohol. Its composition is $C_{11}H_5O_5ZnO+3aq$, and it contains 23·95 per cent. zinc oxide. It has been employed as an antiseptic astringent in the blennorrhagia, purulent ophthalmia, etc., the solution containing 0·5 to 4 grms. of the salt to 100 grms. of distilled water.—*Jour. de Phar. et de Chim.*, Jan., 1878, p. 41.

The transformation of glycerin into glucose has been reported by C. Kosmann, and was asserted to have been accomplished by four processes, in all of which the reduction of Fehling's solution was regarded as sufficient proof of the presence of glucose. L. Liebermann has repeated the experiments and found the reducing action due in two cases to the presence of ferrous oxide, caused by the oxidation of iron (on digesting lard or glycerin with sheet iron), or of manganous salt (resulting by treating aqueous glycerin with permanganate of potassium in *the cold*), or of chromic hydrate remaining dissolved in the glycerin; the latter was obtained by the action of solution of potassium bichromate and sulphuric acid upon glycerin, and, subsequent, neutralization with sodium carbonate. Liebermann recommends caution in testing urine for glucose, since iron preparations are frequently used in medicine.

Redtenbacher has previously observed that glycerin, in contact with yeast, evolves a gas, producing at the same time metacetic acid without undergoing alcoholic fermentation.—*Ber. d. deutsch. Chem. Ges.*, 1877, p. 2095.

Atropia and Daturia.—A. Poehl has investigated the cause of the well-known and generally acknowledged difference in the medicinal activity of commercial atropia and its salts, which Hager has been inclined to attribute to the presence of another alkaloid, probably belladonnia. The supposed chemical identity of atropia and daturia, asserted by Planta, has led to the practice of preparing atropia not only from the root and leaves of belladonna, but, likewise, from the leaves and seeds of stramonium. Poehl has recently again examined the two alkaloids prepared by himself and found the following differences:

Atropia is optically inactive, but daturia turns polarized light to the left, its specific rotating power being—14·12°. Atropia salts are precipitated by platinic chloride, but daturia salts are not affected by the same reagent. Atropia salts are not precipitated by picric acid, which, however, precipitates daturia salts. The two alkaloids are therefore

chemically not identical, and the differences in the physiological action of commercial atropia is doubtless due to the absence or presence, in larger or smaller proportion, of daturia.—*Chem. Centralbl.*, 1878, No. 7—*Petersb. Med. Wochenschr.*, 1877, No. 20.

Morphiometric Examination of Opium.—Prollius recommends to prepare a tincture of opium of officinal strength, using, however, 34 per cent. alcohol. 100 parts of the tincture are agitated with 50 parts ether and 2 ammonia and then set aside. The liquids separate slowly, and retain, partly in the ether, partly in the alcoholic liquid, the coloring matter, narcotin and other crystallizable constituents of opium, while the morphia separates in crystals between the two layers and finally sinks to the bottom. The fluid portion is decanted, the crystals are washed with a diluted alcohol, dried and weighed. This method has the advantage over Guillermond's, in the use of a weaker alcohol and the addition of ether.—*Phar. Cen. Halle*, No. 2—*Schweiz. Wochenschr.*

Pao-Pereira.—This Brazilian tree belongs to the Apocynaceæ and has been variously designated as *Picramnia ciliata*, *Vallesia punctata*, *Tabernæmontana lævis* and *Geissospermum Vellosii*; after examining the leaves and stems, Baillon referred it to *Geissops. læve.* The very bitter bark contains an alkaloid which was obtained by Santos in 1838, and named pereirin, but is now proposed to be called geissospermia.

Bochefontaine and DeFreitas have found the leaves to be likewise bitter and to contain the same alkaloid, though in less quantity. The alkaloid, as used in Brazil, is not pure but occurs as a brownish yellow amorphous powder. The authors found geissospermia to be a toxic substance, exercising no local irritant action when administered subcutaneously; it is a poison which acts by destroying the physiological properties of the central nervous grey matter.—*Phar. Jour. and Tran.*, Sept. 8, 1877—*Comp. Rend.*, lxxxv.

Geissospermia has likewise been obtained by O. Hesse, independently of the above named authors. It occurs in small white prisms, easily soluble in alcohol, nearly insoluble in ether and water, but readily soluble in dilute acids. Concentrated nitric acid dissolves it with a purple color, passing, when heated, to orange yellow. Concentrated sulphuric acid dissolves it, the solution becoming gradually blue and finally again colorless; in the presence of iron the solution is at once blue, but likewise becomes colorless. The dark-blue color, with

sulpho-molybdic acid, remains unchanged after 24 hours. Its composition is $C_{19}H_{24}N_2O_2+H_2O$.

The bark contains also a greyish-white amorphous alkaloid, which is readily soluble in ether, colors nitric acid blood-red and pure sulphuric acid violet-red; the name pereirina is proposed for it.—*Ber. d. Chem. Ges.*, 1877, p. 2163.

LIQUEFACTION OF GASES.

Almost simultaneously, and entirely independent of each other, the liquefaction of oxygen was accomplished in December, 1877, by L. Cailletet of Paris and Raoul Pictet of Geneva. Cailletet's letter to the Academy of Sciences announcing his discovery was dated December 2, sealed by the permanent secretary on the following day, and read before the Academy December 24, when Mr. Dumas announced that

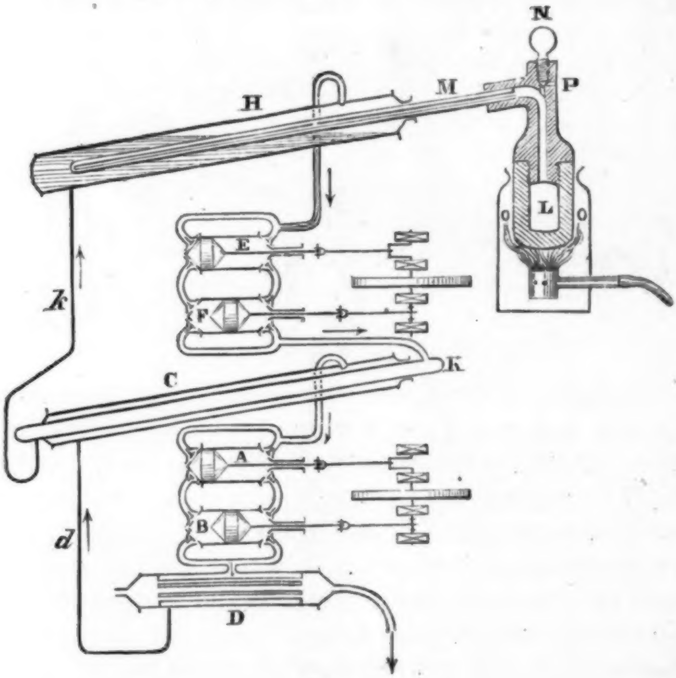


Fig. 1.

the same result had been accomplished by Pictet December 22, of which he had been informed by telegraph.

The liquefaction of one of the hitherto so called "incoërcible" gases having been accomplished, it was followed before the close of the year by similar results obtained by Cailletet with the remaining two, nitrogen and hydrogen, the latter of which was solidified by Pictet January 9; atmospheric air has likewise been liquefied. The following description of the apparatus with which these results were accomplished has been condensed from "Jour. of the Franklin Institute," to which we are likewise indebted for the cuts.

Pictet's apparatus, Fig. 1, contains two pairs of pumps, *A* and *B*, so coupled that while one exhausts the other compresses. One pair operates upon liquid sulphurous anhydrid contained in the annular recipient *C*, its evaporation reducing the temperature to —65°C.; the gas is pumped into *D*, where it is condensed by pressure and cold water, and returns through *d* to *C*. The other pumps remove from the annular recipient, *H*, liquid carbonic acid, the evaporation reducing the temperature to —140°, and force the gas into *K*, where it is recondensed by pressure and cold, the liquid flowing through *k* again into *H*.

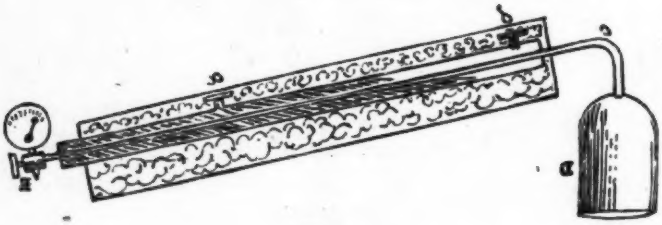


Fig. 2.

L is a wrought-iron retort resisting a pressure of 500 atmospheres, in which oxygen is generated from a mixture of chlorate with chloride of potassium. When the pressure in the tube *M* has reached 320 atmospheres, the temperature of the contents being —140°, the removing of the plug *N* opens the orifice *P*, through which the oxygen escapes with violence, producing an absorption of heat sufficiently great that a part of the gas liquefies in *M*, and is thrown out in a liquid jet from the orifice if the apparatus be inclined.

The same retort, tube and condenser are shown in Fig. 2, in which the entrance of the liquid carbon dioxide is shown at *a*, and the exit of the vapors withdrawn by the suction pump at *b*. Instead of the orifice in the tubulure of the retort the condenser is closed with a screw valve, *E*, which connects with a manometer, graduated to 800 atmospheres.

Since isomorphic bodies have the same atomic volume, equivalent divided by density, and oxygen belongs to the group of sulphur, the atomic volume of which is $\frac{32}{2}=16$, according to Dumas the density of solid, and probably also of liquid oxygen, should be $\frac{16}{16}=1$. Pictet has verified this by determining that a tube of 46·25 cc. capacity held 45·467 grams of liquid oxygen, the slight difference of ·8 gram being probably due to incomplete filling or slight variation in temperature.

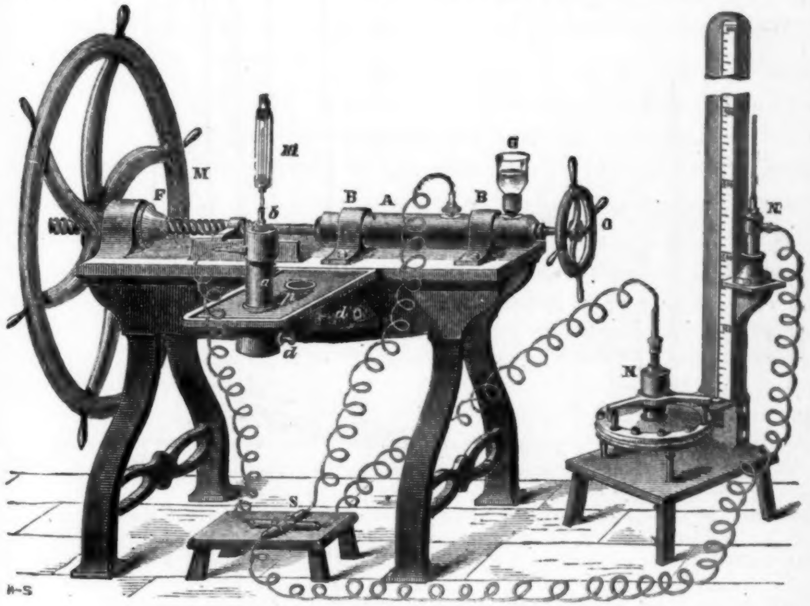


Fig. 3.

Cailletet's Apparatus.—The hollow steel cylinder *A* is fastened to an iron frame by the straps *B*, and when filled with water through the cup *G*, a very high pressure may be produced in any vessel with which it may be connected, upon turning the large hand-wheel *M*, the hub of which, revolving in the journal-box *F*, forms a nut, by which the square-threaded screw of a steel plunger is worked. The flow of water is controlled by a screw plug operated by the small hand-wheel *O*, whereby also the pressure exerted upon gases may be suddenly relieved. The water is forced through a small metal tube into the hollow cylinder *a*, which is supported by the tablet *p*, and capable of withstanding a pressure of 900 to 1,000 atmospheres, measured by the

gauges *N* and *N'*. *a* contains the mercury reservoir, into which is plunged the glass tube filled with gas. This part of the arrangement is shown in Fig. 4, which is half size.

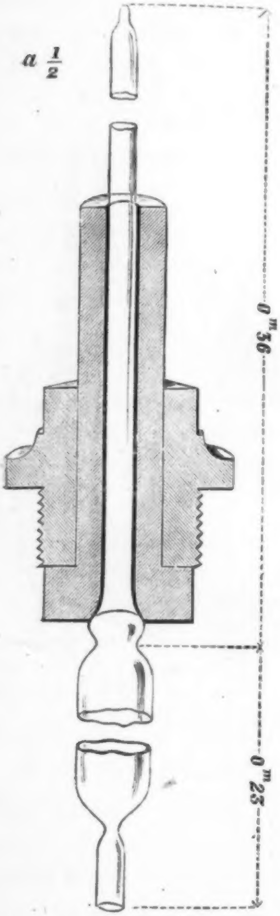


Fig. 4.

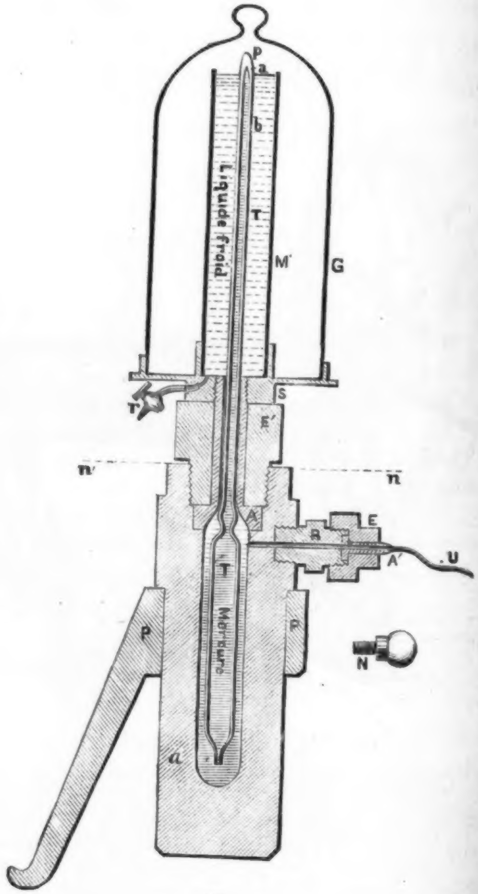


Fig. 5.

Fig. 5 represents the same portion of the apparatus supported on a tripod, *P*, for use in lecture experiments in connection with any powerful force-pump. *E* is a hollow nut for connecting the pipe *U*, and *N* is a plug for closing the orifice in *R* when the reservoir *a* is being filled with mercury. After introducing the open end of the gas tube, *T*, into the mercury the other parts of the apparatus are placed in position, as

shown. The upper end of *T* is surrounded by the glass cylinder *M*, containing liquid nitrous oxide or other freezing mixture, and covered by the bell-glass *G*, which contains material for absorbing the moisture which would otherwise collect upon *M* and obstruct observation. The liquid freezing mixture may be withdrawn through the stop-cock *r*.

The water entering through *U* presses upon the mercury, forcing it into *T*, and compressing the gas, which is finally liquefied between *b* and *p*. The apparatus is easily managed, and with it and the aid of the oxy-hydrogen light, all the phenomena of the liquefaction of gases can be projected on the screen.

MINUTES OF THE COLLEGE.

PHILADELPHIA, March 25th, 1878.

The annual meeting of the Philadelphia College of Pharmacy was held this day, at the hall, No. 145 North Tenth street, Dillwyn Parrish, President, in the chair. Nineteen members were in attendance and signed the register.

The minutes of the meeting in December last were read and, on motion, adopted. The minutes of the Board of Trustees were also read by the Secretary of the board, and, on motion, adopted.

The by-law defining the duties of the Actuary, which was proposed at the last meeting of the College, and referred to this meeting, came up for consideration. After some discussion it was amended and, on motion, adopted as follows:

CHAPTER VII.

The Actuary shall be elected by the Board of Trustees, and shall be in attendance at the hall of the College, which shall be kept open, under his care, from the hours of 3 to 5 P. M., and 6 to 10 P. M., during the continuance of the lectures; and for the remainder of the year from 3 to 6 P. M. (Saturdays excepted).

He shall also discharge the duties of the Librarian, of the Curator, and of the Registrar of the Pharmaceutical Meetings, under their advice and direction.

This addition would necessitate the following changes: Present Chapter VII to be Chapter VIII, Chapter VIII to be Chapter IX, Chapter IX to be Chapter X, Chapter X to be Chapter XI, Chapter XI to be Chapter XII, Chapter XII to be Chapter XIII, Chapter XIII to be Chapter XIV, Chapter XIV to be Chapter XV.

Mr. Wiegand, Librarian, read the following, which was, on motion, accepted:

The Librarian respectfully reports that during the past year he has bound the theses for the year 1877 and that there has been added to the library 304 volumes—210 presented, 30 by exchange, 64 by purchase.

There has been expended, by order of the Board of Trustees, on account of books purchased, $76.44; for binding of books (202 volumes), $80.25.

During the past year the "Répertoire de Pharmacie" has been completed, except the 29th volume; also the "Chemical News" and "Chemist and Druggist," "American Naturalist" and "Popular Science Monthly," "Watts' Dictionary of Chemistry," "Silliman's Journal of Science and Arts," "Journal of Franklin Institute," "Archiv der Pharmacie," "Proceedings of American Pharmaceutical Association," "Sanitarian"—all being serials of general interest to our members.

Any of the members who may have any of the following editions of U. S. Dispensatory, namely, 1st, 3d, 6th, 9th, 11th, which they be willing to dispose of, would confer a favor by sending them to the Librarian.

J. P. Remington, Curator, read a report of the condition of the cabinet, as follows, which was accepted:

PHILADELPHIA, 3d mo. 25th, 1878.

The Curator would report that, owing to the prospect of a gift of new cases for the accommodation of the Centennial specimens, the labor of relabeling and arranging has not yet been commenced.

Many specimens have been presented at the Pharmaceutical Meetings through members of the College, students, etc., and it is believed that time will be had during the coming months to resume work upon the labeling and rearrangement. The action of the College in appointing an Actuary, part of whose duties shall be those of the Curator, will no doubt result in an improvement to the interest of the cabinet.

Respectfully submitted, JOS. P. REMINGTON.

The report of the Publication Committee was then read by Henry N. Rittenhouse, on behalf of the committee. It was approved and is as follows:

PHILADELPHIA, March 25th, 1878.

To the Philadelphia College of Pharmacy:

GENTLEMEN—We have the pleasure to report to you the operations of the Publishing Committee of the College for the year just closed. Considering the very discouraging condition of mercantile and financial affairs which now and for some time past have continued in this country, the committee are well satisfied with the result of the year's business, which will be seen by a reference to the reports of the Treasurer, Editor and Business Editor.

We would suggest to the members that more advertisements of a suitable character are desired, and we think will repay those who use the pages of the "Journal" for this purpose. The charges will be found reasonable for the service rendered.

We would urge upon the members of the College who are engaged in laboratory work, to contribute to the "Journal" such observations as they may deem of general interest. This is particularly desirable for the next year, during which time the Pharmacopœia will be in review by different committees appointed fer that purpose. HENRY N. RITTENHOUSE, *Chairman.*

The report of the Treasurer of the committee was read by Mr. Bullock. It exhibits the usual favorable condition of that department of the College, and merits the approval of all the members.

The Editor's report to the Publishing Committee was then read, and, on motion, accepted. It gives a very interesting account of the Editor's labors.

The Editor respectfully reports, that the "Journal" has been regularly issued during the past year on the first of each month. The original papers contributed to the "Journal," it is believed, have been of such a character as to sustain its scientific, and, at the same time, practical character, both at home and abroad, as may be judged from the transferring of many of its original articles to the columns of other journals; and likewise, from the fact that four citizens of foreign countries, three of whom are connected with the College by corresponding or honorary membership, have contributed five papers. The amount of this original matter has been so great, as to render it necessary to increase the size of two numbers from forty-eight to sixty-four pages, while, at the same time, most of the essays appearing in foreign journals had to be made accessible to the readers in a materially condensed form.

For the year ending with the March number, 1878, the original papers, exclusive of editorials, gleanings and original translations, reached the number of one hundred and six, being only five less than in the preceding year, in which probably the largest number of original essays had been published. Sixteen of these papers contained longer or briefer abstracts of theses, representing altogether twenty-six of the latter, of which fifteen related to strictly pharmaceutical subjects, one to chemistry, nine to materia medica and one to a subject of general interest. The direct contributions to the "Journal," similarly classed, embrace forty-five papers on pharmacy, twenty on chemistry, twelve on materia medica, and thirteen on subjects of general interest.

The contributors during the past year were sixty-three in number, which is an increase over the years up to March, 1875, but a falling off as compared with the reports in 1876 and 1877, when respectively seventy-two and seventy-seven authors had contributed. The smaller number of authors was, however, compensated for by an increased number of papers furnished by some. While forty-six papers were credited to the same number of authors, we have had seven contributors furnishing two papers each, three with three papers each, six with four papers each and one contributing thirteen papers.

During each of the last three years sixteen members of the College have written for the "Journal," while their contributions have increased from twenty seven in 1876 to thirty-five in 1877, and forty-one during the year just closed, without counting those of the corresponding and honorary members.

Four of the published papers had been read before pharmaceutical associations in other cities, and twenty-one at meetings held in this College.

Respectfully submitted, JOHN M MAISCH, *Editor.*

The chairman of the Sinking Fund Committee furnished a statement of the condition of the fund, which shows that the College is steadily discharging its indebtedness.

A letter from William Evans, tendering his resignation as a member of the College, was read, and, on motion, accepted.

Prof. Maisch stated that a number of answers had been received from individuals and associations abroad, stating that the offers of this College to furnish specimens of indigenous drugs would be acceptable, and that they would endeavor to reciprocate such favors as far as practicable, by exchanges of such drugs as were indigenous to their localities.

Mr. Bullock moved that a committee of five be appointed to consider the propriety of changing the mode of electing the Board of Trustees; the committee to perfect a plan and report to the next meeting of the College.

The motion, after discussion, was adopted, and the following gentlemen were appointed the committee, viz.: Chas. Bullock, Ambrose Smith, Thos. S. Wiegand, Daniel S. Jones, Robert Shoemaker.

This being the Annual Meeting, an election was ordered. The President appointed Samuel S. Bunting and Edward C. Jones tellers, who reported the following officers, trustees and committees elected:

President—Dillwyn Parrish.
First Vice President—C. Bullock.
Second Vice President—Robert Shoemaker.
Treasurer—Samuel S. Bunting.
Recording Secretary—William J. Jenks.
Corresponding Secretary—Alfred B. Taylor.
Board of Trustees—Robert Bridges, M. D., John M. Maisch, Daniel S. Jones, Thomas S. Wiegand, James T. Shinn, T. Morris Perot, William B. Webb, Joseph P. Remington.
Publication Committee—John M. Maisch, H. N. Rittenhouse, Thomas S. Wiegand, James T. Shinn, Charles Bullock.
Sinking Fund Committee—Thomas S. Wiegand, T. Morris Perot, James T. Shinn.
Editor—John M. Maisch.
Librarian—Thomas S. Wiegand.
Curator—Joseph P. Remington.

Then, on motion, adjourned. WILLIAM J. JENKS, *Secretary.*

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, March 19th, 1878.

The meeting was called to order by Dillwyn Parrish, President; the minutes of the last meeting having been read, they were approved.

Prof. Maisch, on behalf of Dr. F. V. Greene, U. S. N., presented a specimen of the fruit of the Jurubeba, Solanum paniculatum, preserved in alcohol, which resembles the fruit of the potato, and an examination of which was published in "Amer. Jour. Phar.," 1877, page 506; also a section of the wood of a species of Bauhinia, from Brazil, peculiarly variegated with dark veins, susceptible of high polish and evidently well adapted for cabinet makers' use.

Mr. Debrunner, of Pittsburg, sent specimens of cast steel containing 99 per cent. of pure iron; also drillings and filings, obtained without the use of oil, from the same metal, and a sample of Saxony manganese containing 93 per cent. of manganic dioxide.

A specimen bottle of a kind intended to be employed for poisonous liquids was exhibited; the bottle was shaped like an ordinary Seltzer bottle, but upon one side was cast a death's head and cross-bones, with the word poison—a most hideous looking affair—the objection to these bottles, which have raised figures on them, is the great liability to breakage; the prominences being very apt to be broken through. The whole subject of employing particular styles of bottles for poisons was debated for a short time, Prof. Maisch referring to the danger arising from the fact that those who had become used to having all poisonous substances dispensed in a peculiar style of bottle, would conclude that those articles in other kinds of bottles were innocuous.

A sample of the fruit of the Japan persimmon, a species of Diospyros, was presented; a member stated that the tree had been acclimated in this country.

Prof. Remington read a paper upon an apparatus for "porousing" plasters, as it is termed (see page 171); such an apparatus he thought desirable, as the plasters of this kind, put upon the market by some wholesale manufacturers, were not reliable, some of the makers admitting that they made two articles of the same name, one which did not contain a trace of the drug after which it was called; the apparatus was exhibited and explained, and the paper referred to the publication committee.

One of the members présent asked what was meant by *unvitrified salts*; he believed it was used for battery purposes; the expression would properly mean salts which had not undergone igneous fusion; no one present was acquainted with the term as applied to any special article.

Prof. Maisch exhibited samples of *coniferin* and artificial *vanillin*; the former a product from the juices of the cone-bearing trees, the latter a derivative of it, has a very decided odor of Mexican vanilla, free from that admixture of tonka odor which was noticed in the vanillin exhibited at the Centennial Exposition; it is made in Germany by a patented process, and, although quite expensive, so great is its strength that it is claimed to be much cheaper as a flavoring agent than vanilla itself.

Mr. Boring inquired whether there was a formula for *tincture of protochloride of*

iron published anywhere. Prof. Maisch stated such a tincture might be readily made, but was neither officinal in the French or German Pharmacopœia, the latter directing an aqueous solution of spec. grav. 1·23; ferrous chloride was rather less freely soluble in alcohol than ferric chloride.[1]

A formula for *Cremer's Pomade* was asked for; the preparation was referred to in "Braithwaite's Retrospect," Jan., 1878, p. 198, as an application to the eye, but without giving the formula, which could also not be found in a number of works that were consulted.

A member called the attention of the meeting to a statement in some of the daily papers relative to a new industry which has been lately developed in Pottsville, Pa., that of distilling the oils of Gaultheria and several other native plants, the children gathering the crude drugs and bringing them to those who have commenced the distillation of the oils.

In answer to an inquiry for the formula for nigrosine ink, it was stated that two formulæ were published in "Amer. Jour. Phar.," 1875, p. 88, and 1876, p. 54; it seems to possess the advantage that it penetrates the texture of the paper, and a label that has been written with it, when pasted, does not become smeared by the necessary handling when being rubbed smooth upon the bottle. This ink seems to be more permanent than other anilin inks, which usually fade on exposure. Eosin (a very brilliant scarlet) ink is also made from an anilin color, the name, however, is improperly applied, the word meaning merely rosy-colored, not scarlet. Some remarks were made about writing inks which would not be removed by either acids or alkalies, and it was stated that the object could be attained by adding to a nutgall ink some solution of indigo, or a solution of soluble Prussian blue; the latter compound is obtained by precipitating a ferric salt with an excess of ferrocyanide of potassium, decanting the mother liquor, and washing the precipitate with water until it becomes soluble therein.

Prof. Maisch exhibited a specimen of Java cinnamon, it resembled the variety that came in the market some years ago as Chinese cassia, but was a much thinner bark, and appears to be obtained from Cinnamomum Zeylanicum, grown in Java, and not deprived of its suberous layer.

Adjourned. T. S. Wiegand, *Registrar.*

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

Philadelphia College of Pharmacy.—The general examination was conducted in the same manner as in the preceding year, one afternoon being devoted to each branch and written answers required to the following questions:

QUESTIONS ON CHEMISTRY.

1. What sulphates of the heavy metals (Sp. Gr. over 6) are officinal in the U. S. P.? Give the method of preparation of each and explain the reactions which take place,

[1] Hager directs the tincture to be made by mixing 8 parts, each of alcohol and solution of ferrous chloride, and adding 1 part of simple syrup.—Editor.

together with the formulæ expressing these changes. State the physical and chemical characters which are distinctive of each salt.

2. What is the source of the Carbonates of Potassium? State the different commercial and officinal forms, the methods by which they are produced, and the impurities which may be present in any variety.

3. What is the mode by which "Sodii Phosphas," U. S. P., is prepared? Give its composition, its physical and chemical characters, and the change produced in it by an elevated temperature

4. What preparations of silver are officinal? State the methods by which they are prepared and explain, both by words and formulæ, the chemical changes which take place during their production. Which of its compounds is most liable to adulteration, and how can this be detected?

5. What is the officinal process for preparing Iodide of Potassium? Explain the process and give formulæ for the reactions which take place.

6. State the three principal modifications of Phosphoric Acid. Give of each its characteristic chemical name and composition. By what tests may they be distinguished from each other?

7. What is "Hydrargyri Oxidum Flavum," U. S. P., and what is the method by which it is prepared? Why does it differ in color from "Hydrargyri Oxidum Rubrum," and by what means can this latter be made to resemble it in appearance?

8. What are the antidotes for "Arsenic"? State the best form and condition in which they can be used.

9. What are the physical characters and chemical tests by which ferrous and ferric Salts are distinguished from each other?

10. What are the antidotes for the Mineral Acids and for the Alkalies? State their mode of action.

QUESTIONS IN MATERIA MEDICA AND BOTANY.

1. Which plants yield the *liquorice root* of commerce? To which natural order do they belong, and where are they indigenous? Describe the principal varieties of the root, pointing out the essential differences between them, and give the name and nature of their sweet principle.

2 What is *ginger?* Give the name, natural order and habitat of the plant yielding it; describe its physical and structural characteristics, pointing out the differences, with their causes, of the principal commercial varieties, and name its medicinal properties and important constituents.

3. What is *slippery elm bark?* Name the plant, its natural order and habitat. Describe the physical and structural peculiarities of the drug; give its medicinal properties and main constituents, and state in what respects it differs from other elm barks.

4. What is *Iceland Moss?* Give the name, natural order and habitat of the plant; describe the drug; name its medicinal properties and important constituents, and state how it may be deprived of its bitter taste.

5. Name the plants yielding the officinal *flowers of the compositæ*, and give the characteristics of these drugs, their constituents and medical properties.

6. What *fruits of the Piperaceæ* are officinal? Name the plants and their habitat yielding them; state at what period they are collected; describe them briefly; enumerate their proximate principles and state to which their medicinal properties are due.

7. Give the name, natural order and habitat of the plant yielding *flaxseed*; describe briefly the physical and structural characteristics of the seed, its important proximate principles, their amount and location in the tissues.

8. Describe the general character of *starch*, its composition and its behavior to solvents and to chemical agents. How may *arrow root* be distinguished from other starches?

9. Define *volatile oils* as to character, origin, preparation, classification and physical properties. Name the principal adulterations, with methods for detecting them.

10. Give the characteristics of the natural order of *Labiatæ*, and name the medicinal herbs belonging to it.

QUESTIONS IN THEORETICAL AND PRACTICAL PHARMACY.

1. A bottle holds 4,860 centigrams of a liquid having the specific gravity ·750. How many troyounces, drachms, scruples and grains respectively of officinal Aqua, Spiritus Ætheris Nitrosi, Liquor Hydrargyri Nitratis would it contain at the same temperature?

2. Define, illustrate and explain the objects of the following classes of officinal preparations—Chartæ, Glycerita, Linimenta, Resinæ, Trochisci.

3 Give the synonyms and brief outlines of processes for Phenylic, Amylic, Ethylic, Methylic and Propenyl Alcohols; also, for Valerianic, Salicylic, Benzoic, Gallic and Hydrocyanic Acids.

4. Pyroxylon—How is it prepared? What officinal preparations contain it, and how are they made? What is its chemical name, uses and properties?

5. Name the ingredients used in preparing Oleum Æthereum, Ammonii Iodidum, Atropiæ Sulphas, and describe the appearance of the finished products.

6. Describe briefly the processes for preparing the following, giving the ingredients in each: Acetum Scillæ, Infusum Gentianæ Compositum, Mistura Cretæ, Spiritus Juniperi Compositus, Pilulæ Antimonii Compositæ, Syrupus Sarsaparillæ Compositus, Tinctura Rhei, Trochisci Glycyrrhizæ et Opii, Unguentum Cantharidis, Vinum Rhei.

7. State the proportions and doses of the officinal preparations of Opium.

8. Give the ingredients used in five solid and three liquid preparations of Aloes, of the U. S. Pharmacopœia. What are the active principles of the different varieties of the drug, and how may they be distinguished from each other?

9. Write out a description of the physical properties of Sulphate of Quinia, giving its solubilities and *tests* for identity, purity—including Liebig's, Herapaths, Stoddart's.

10. Describe the physical appearance and characteristics, and give the tests for the active principles obtained from the following: Stramonium Seed, Monkshood, Hemlock Fruit, and give the process for the strongest officinal preparation of each.

QUESTIONS BY THE EXAMINING COMMITTEE.

1. Define briefly, or illustrate, the following terms: Symbol, Element, Atom, Molecule, Atomic Volume, Molecular Volume, Quantivalence, Formula, Equation, Acid.

2. What is the chemical composition of Æther, and how is it prepared? Give its specific gravity; and name an officinal preparation into which it enters. What is the officinal name of the purified product? Give three officinal preparations which contain it.

3. Sulphuric Acid—state its officinal name and specific gravity; describe the process of its manufacture; name two officinal preparations which contain it in a free state. What antidote should be administered in case of poisoning with this Acid?

4. What is nutmeg? Give its officinal name; also, the locality and natural order of the plant which produces it. What other officinal drug is obtained from the same source; Give its officinal definition and describe its appearance. Upon what principles contained in these products do their virtues depend?

5. Give the botanical name, habitat and natural order of the plant yielding Opium. What is the common name of the fruit which furnishes it? Describe the process for obtaining it, and give its dose; name four alkaloids contained in it.

6. Give the officinal name and definition of Senna, its habitat, medicinal property and dose; name four officinal preparations into which it enters. Give the commercial names of the two chief varieties, and the botanical name of the leaf which is usually found mixed with one of these varieties.

7. State the formula for preparing Donovan's Solution. Give its officinal name, color and dose. What change takes place on standing? What causes this change, and how would you remedy it?

8. Give the officinal title, mode of preparation, and the ingredients used in the following: *Neutral Mixture, Soap Liniment, Blistering Cerate, Spirit of Mindererus, Collodion.*

9. Give the ingredients used and describe the process for making *Pilula Ferri Carbonatis, Confectio Sennæ, Syrupus Pruni Virginianæ, Extractum Ergotæ Fluidum, Acidum Tannicum.*

10. Would you dispense this? Give your reasons.

A.

℞—Tinct. Ferri Chloridi, . f ℥ i.
Spirit. Ammon. Aromat., f ℥ i.
Misce.
Sig:—Twenty drops to be taken three times a day.

C.

Can this be safely dispensed?

℞—Acid. Arsenios. Cryst., . gr. iii.
Pulv. Opii, . . . gr. v.
Mix and divide into 30 pills.
Sig: One pill to be taken morning and evening.

B.

State the mode of preparing this. Would you dispense it?

℞—Olei Tiglii, . . . f ʒ ii.
Tinct. Opii, . . . f ʒ i.
Pulv. Acaciæ,
Sacchari, . . . āā, ʒ i.
Aquæ Menth. Virid., . f ℥ ii.
Sig:—A tablespoonful to be taken every hour till it operates.

D.

How would you prepare and dispense the following Gargle? Would it keep well?

℞—Potass. Chlorat, . . ʒ i.
Tinc. Ferri Chloridi, . f ℥ ss.
Muc. Acaciæ, . . f ℥ ii.
Syr. Zingib., . . . f ℥ i.
Aquæ, ... f ℥ iss.
Sig:—To be used as directed.

The specimens for recognition were as follows:

Chemistry.	Materia Medica.	Pharmacy.	Examining Committee.
Acid. nitro-muriaticum.	Senega.	Alcohol.	Acid. aceticum.
Potassii bicarbonas.	Filix Mas.	Æther.	Acid. gallicum.
Potassii chloras.	Geranium.	Tinct. nucis vom.	Podophyllum.
Sodii carbonas.	Cascarilla.	Vinum Ergotæ.	Cimicifuga.
Liqu. sodæ chlorinatæ.	Stramonii Fol.	Infus. Rosæ comp.	Lycopodium.
Ammonii chlorid. purif.	Hedeoma.	Syrup. Ipecacuanhæ.	Resina.
Ferri subcarbonas.	Rhus glabra.	Confectio Sennæ.	Cerat. Cantharidis.
Plumbi oxidum.	Coriandrum.	Ung. Stramonii.	Syrupus Scillæ.
Plumbi acetas.	Myrrha.	Pulv. Rhei comp.	Tinct. Opii camphor.
Acidum oxalicum.	Cantharis.	Morphiæ Sulphas.	Extr. Buchu fluid.

In the practical examination the candidates were required to put up the following prescriptions:

℞ Extract: Opii, ... gr. vi.
Ol: Theobromæ, ... q. s.
Make 6 suppositories, 15 grs. each.

℞ Olei Ricini, ... f ℥ iss.
Pulv: Acaciæ, ... ʒ iii.
Pulv: Sacchari, ... ʒ i.
Tinct: Opii, ... f ʒ i.
Aquæ q. s. ut fiant . . f ℥ iv.
Make an emulsion.

℞ Cinchonidiæ Sulph: . gr. xxxvi.
Acid: Tartaric: . . . gr. x.
Glycerin: . . . . . . q. s.
Make 12 pills.

℞ Zinci Oxidi, ... gr. lxxx.
Ung: Benzoini q. s. ad . ℥ i.
Make an ointment.

The following candidates passed the examination, and were recommended for the Degree of Graduate in Pharmacy:

David Patrick Miller, Virginia, *Tobacco Cultivation in Virginia.*
William Reynolds Keeney, Pennsylvania, *Extemporaneous Pill-Coating.*
Charles Herman Gardner, Pennsylvania, *Borate of Bismuth.*
Ernest Charles Federer, Ohio, *Powdered Calisaya of Commerce.*
Frank Roop Smith, Delaware, *Carya Tomentosa.*
Charles Edwin Barton, Ohio, *Dialyzed Iron.*
Charles Edwin Button, Missouri, *Syrups, by Cold Percolation.*
Wilford Oldham Higgate, Pennsylvania, *Extractum Pruni Virginianæ Fluidum.*
Delbert Elwyn Prall, Michigan, *Infusum Digitalis.*
Lawrence Minor Bullock, New Jersey, *Bark of Castanea Vesca.*
Ernest William Reinecke, Pennsylvania, *The Fruit of Citrus Limonum.*
David Wilmot Fawkes, Delaware, *Grindelia Robusta.*
William Spencer, Pennsylvania, *Preparations of Subacetate of Lead.*
Francis Xavier Wolf, Pennsylvania, *The Pharmacist.*
Charles Foster Lilly, Pennsylvania, *Linimentum Saponis.*
Evan Davis Lloyd, Pennsylvania, *Opium.*
Thomas Canby Craig, Pennsylvania, *Analysis of Chambersburg Hydrant Water.*
Joseph Vincent Wingert, Pennsylvania, *Iris Versicolor.*
Louis Adolph Podolski, Pennsylvania, *Chloral Hydrate.*
Wallace Geary Bobb, Pennsylvania, *Prescriptions.*
Norman Isaac Brunner, Georgia, *Pharmaceutical Legislation.*
David George Hurley, Pennsylvania, *Japan Wax.*
Cornelius Ederson Spenceley, Pennsylvania, *Hepatica Triloba.*
John Windham Harrison, West Virginia, *The Necessity for Thorough Pharmaceutical Knowledge.*
George Washington Gray, Delaware, *Tuber of Exogonium Purga, Ipomœa Jalapa.*
Elwood Gouldy Hendricks, Pennsylvania, *Hints on Pharmaceutical Manipulations.*
Frank Fremont Trimble, Ohio, *Cimicifuga Racemosa.*
Jacob Francis Orsell, Jr., Pennsylvania, *Salicylic Acid and its Congeners.*
George William Sample, Pennsylvania, *Arsenicum and Acidum Arseniosum.*
Herman Lerchen, Iowa, *Hydrastis Canadensis.*
Andrew Alexander Kroeg, South Carolina, *Doubtful Opium.*
Benj. Carpenter Waterman, Indiana, *Disinfectants.*
Jacob Samuel Beetem, Pennsylvania, *Doryphora Decemlineata.*
William Henry Deprez, Indiana, *Extractum Cannabis Indicæ.*
George Perry Hilton, New Jersey, *The Papaver Somniferum, its Products and their Uses.*
Edward Peat, Ohio, *The Double Formulæ of the U. S. P.*
Henry Bedell Crane, New Jersey, *Ferrum Dialysatum.*
Thomas Winfield Wilson, Pennsylvania, *Dispensing of Prescriptions.*
Edward Jacobs Newcomer, Virginia, *The Responsibility of Pharmacy.*
George William Davy, Pennsylvania, *Murexide.*
John Aiken Falck, Pennsylvania, *Aqua Acidi Carbonici.*
David Franklin Shull, Ohio, *Erythroxylon Coca.*
John Frederick Mossberg, Sweden, *Emulsions.*
Herman Betz, Iowa, *Coagulating Power of Pepsin.*
Otto Werckshagen, Pennsylvania, *Syrupus Rhei Aquosus.*
Lorenzo Dow Loper, New Jersey, *The Progress of Chemistry.*
John Anthony Selinger, Pennsylvania, *Belladonna and Opium.*
Thos. Trew Brown, Maryland, *Faults of the Pharmacopœia.*
Harry Cox, Pennsylvania, *Tinctura Opii.*

SAMUEL E. ROBINSON, Pennsylvania, *First Year's Apprenticeship.*
EDWIN ROSENTHAL, Pennsylvania, *Liquor Potassæ.*
GEO. WALBRIDGE BROWN, New York, *Saccharated Pepsin.*
MAHLON KRATZ, Pennsylvania, *The Pharmic Lantern.*
OMAR HENRY MUSSER, Pennsylvania, *The Law of Equal Molecular Volumes and the Atomic Theory.*
PAUL JOHN SUESS, Pennsylvania, *Rubus Villosus.*
JOHN WESLEY LEHMAN, Pennsylvania, *The Use of Glycerin in Fluid Extracts.*
NORMAN R. DEAN, Pennsylvania, *Suppositories.*
CHARLES THOMAS CAHOON, Pennsylvania, *Sugar and its Derivatives.*
CHARLES DARIUS FARWELL, Vermont, *Assay of Commercial Extracts and Resins of Jalap.*
ANDREW ALLISON WHITE, Pennsylvania, *Tincture of Kino.*
FRANKLIN PIERCE ALBRIGHT, Pennsylvania, *Phytolacca Decandra.*
CHARLES FOSSELMAN, Kansas, *Benzin.*
WILLIAM SCOTT FLEMMING, Pennsylvania, *Ung. Oxidi Zinci.*
HARRY AUGUSTUS HALL, Illinois, *Chemistry.*
JACOB STRICKLER, Pennsylvania, *Chimaphila Umbellata.*
GEORGE WILLIAM WHITEHILL, Pennsylvania, *Sulphur.*
HENRY NOSS, Connecticut, *Phytolacca Decandra.*
DANIEL PARKE CUSTIS, Florida, *The Officinal Products of Apis Mellifica.*
ALONZO GEORGE MACKENSON, Pennsylvania, *Plasma* vs. *Adeps in Unguenta.*
JOHN GEORGE JOHNSON, Minnesota, *Preservation of Drugs.*
CLAYTON RICKER MYERS, Pennsylvania, *Pharmacy.*
HOWARD MALCOLM LEVERING, Pennsylvania, *Calamus.*
EDWIN ROBERT ZIEBACH, Pennsylvania, *Hydrargyrum cum Saccharo Lactis.*
GEORGE COOPER PORTER, Pennsylvania, *Heat.*
ISAAC PENROSE JONES, Pennsylvania, *Triosteum Perfoliatum.*
PETER FREDERICK NEPPACH, Oregon, *Berberis (Mahonia) Nervosa.*
WM. PERRY PORTERFIELD, West Virginia, *Ozone as a Disinfectant.*
WALTER KULP LITS, Pennsylvania, *Areca Nut.*
CHARLES MORRISON, Indiana, *False Pareira Brava.*
MARSHALL MOSES ANDRE DAVIS, Pennsylvania, *Opium.*
GEORGE WAGNER MANN, Pennsylvania, *Preservation of Syrupus Scillæ Comp.*
JOSEPH HALBERT KERNAN, Pennsylvania, *Prescription Department.*
NEHEMIAH DAVIS, Delaware, *Salicylic Acid.*
JOHN STEVENSON BARNITZ, Pennsylvania, *Pharmaceutical Uses of Paraffin.*
JAMES W. HORNER, Canada, *The Science of Chemistry.*
EDWARD LEE HUDGIN, Illinois, *Melia Azedarach.*
ALBERT KROUT, Pennsylvania, *Pharmaceutical Uses of Glycerin.*
JOHN HAYS ALLEN, JR., Pennsylvania, *Systematic Pharmacy.*
JOHN KNIGHT BENNETT, New Jersey, *Disinfectants.*
BENJAMIN FRANKLIN BACHE, Pennsylvania, *Duty of Pharmacists.*
SEYMOUR SNOWDEN BURNS, Pennsylvania, *Fungous Growth.*
DAVID HAMBLETON ROSS, Pennsylvania, *Oleum Cajuputi.*
RICHARD CORDELION MARLEY, Delaware, *Accuracy, Neatness and Attention.*
WILLIAM WEIS, Pennsylvania, *Dialyzed Iron.*
THOMAS JEFFERSON WOODWORTH PHILLIPS, New Jersey, *Pharmacy.*
MORRIS KEMERER SWEITZER, Pennsylvania, *Fucus Vesiculosus.*
ISAAC DAVIS, Pennsylvania, *Medicated Syrups.*
THOMAS CRAIGHEAD, Pennsylvania, *Salicylic Acid.*
PETER GRAYBILL, Pennsylvania, *Chemical Research.*

On the evening of March 14th the successful candidates assembled at the College building in response to an invitation from the professors and the members of the Board of Trustees. After spending some time in pleasant conversation the com-

pany repaired to the museum, on the ground floor, where an inviting supper was in waiting for them. After justice had been done to the various good things, a number of toasts were proposed and responded to, mostly in a humorous strain, and brief speeches made by members of the class and of the board. The time passed pleasantly and merrily until the late hour admonished the company to disperse.

The Commencment exercises were held on the evening of March 15th. The Academy of Music was crowded on the occasion, and the stage handsomely decorated, a huge pyramid of bouquets attracting general attention. The degrees were conferred by the President of the College, Dillwyn Parrish, and the valedictory address delivered by Professor Maisch. At the close of this, Mr. Wingert, on behalf of the class, presented a handsome analytical balance to Prof. Remington, who expressed his thanks, with some remarks appropriate to the occasion.

The exercises were enlivened by music from the Germania Orchestra, and closed with the distribution of the bouquets, books and other substantial presents, which had been sent upon the stage by the friends of the graduates.

In response to a call issued in the last number of the "American Journal of Pharmacy," a meeting of the members of the Zeta Phi Society of the Philadelphia College of Pharmacy was held to take into consideration the celebration of the Twenty-fifth Anniversary, which will occur a year hence. Members of the various classes from 1854 to 1878 were present, and the proposition was received with general satisfaction. A committee was appointed to issue a circular, and prepare business for the next Meeting, which will be held in the College, on Tuesday evening, April 9th, at 8 o'clock, when a general attendance is requested.

Alumni Association of the Philadelphia College of Pharmacy.—The Fourteenth Annual Meeting was held on the afternoon of March 13th, President Mattison in the chair. Eighteen members present.

On motion, the reading of the minutes of the previous Annual Meeting, the several meetings of the Executive Board and those of the Social Series was dispensed with, and the annual report of the President was then read, approved and ordered to be printed.

A Nominating Committee from eight graduating classes reported for President, Albert P. Brown; Vice Presidents, Wallace Procter, W. E. Krewson; Recording Secretary, W. W. Moorhead; Corresponding Secretary, F. Marion Murray; Treasurer, Edward C. Jones; to fill vacancies in the Executive Board, John C. Martin, R. V Mattison, who were duly elected.

The Treasurer's report was read, a balance of $85.52 being shown on the credit side.

The Committee on Social Meetings reported in favor of their continuation.

It was resolved, that in future, the committees should consist of two members each from the Board, from the Association at large and from the Zeta Phi Society.

Mr. James A. Stratton, of Bordentown, N. J., was elected as Orator for the next annual reception.

Communications were received from the Alumni Associations of the Cincinnati, St. Louis and New York Colleges, and ordered to be acknowledged. The meeting then adjourned.

In the evening, a reception was tendered to the graduates at the College by the Alumni Association. After a short address by the President, Dr. A. W. Miller delivered the annual address, and the following prizes were distributed: The Alumni gold medal to D. P. Miller, of Virginia, and certificates to C. E, Button, of Missouri, for proficiency in Chemistry; C. E. Barton, of Ohio, for Materia Medica; C. H. Gardner, of Pennsylvania, for Pharmacy, and D. E. Prall, of Michigan, for Pharmaceutical Manipulations; also to David Costelo, of Indiana, for having obtained the highest average in the junior examination. A new feature of this entertainment was the delivery of a valedictory address, on the part of the graduating class. Mr. D. E. Prall, who had been selected for this task, acquitted himself very creditably. The presentation of the Alumni album and remarks by several visitors concluded the exercises.

Massachusetts College of Pharmacy.—At the annual meeting, held Marh 4th, 1878, the following-named gentlemen were elected officers for the ensuing year:

President, Samuel A. D. Sheppard. Vice-Presidents—Thomas L. Jenks, M.D.; William S. Folger. Recording Secretary, D G. Wilkins. Corresponding Secretary, George F. H. Markoe. Treasurer, Charles I. Eaton. Auditor, James S. Melvin. Trustees—Benj. F. Stacey, I. B. Patten, S C. Tozzer, Geo. H. Cowdin, Chas. P. Orne, Edgar L. Patch, Edw. S. Kelley. Secretary of the Board of Trustees, Henry Canning.

The College and the School of Pharmacy were reported to be in very satisfactory condition.

New York College of Pharmacy.—At the close of the forty-eighth session, the following candidates passed the examination, and received the degree of Graduate in Pharmacy:

George P. Bagley, New York, *Results of several Percolations made with the object of finding the exact weights of several carefully prepared tinctures.*
A. P. Baxter, New York, *An Examination of Granular Citrate of Magnesia.*
A. C. Behrens, Germany, *Officinal Ginger.*
H. L. F. Behrens, Germany, *Zinc and its Officinal Preparations.*
P. B. Boles, Virginia, *Borate of Sodium and its Uses.*
C. W. Brunner, New York, *The Officinal Labiates of the United States.*
T. R. Burgtorf, Germany, *The Products of Apis mellifica, their Medicinal Properties and Uses, Adulterations and Tests.*
S. E. Dougherty, New York, *Syrups by Cold Percolation.*
M. C. Drescher, Germany, *Iodine and Iodide of Potassium.*
A. A. Edlich, New York, *Arsenic and its Officinal Preparations.*
H. W. Evans, Kentucky, *Crab Orchard Salts.*
Gerson Gans, New York, *Historic Pharmacy.*
W. Glatzmayer, New York, *Pills and Wafers*
G. D Hayes, New York, *The Morphia Value of Commercial Powdered Opium.*
Theodore Heller, Austria, *Oxide of Ethyl, "Ether."*
Daniel Huber, Jr., New York, *Antimony and its Principal Preparations.*
George Inness, New York, *Hydrobromic Acid (HBr.).*
J B. Jacobus, New Jersey, *Reading and Compounding of Prescriptions.*

W. H. Keeler, New Jersey, *Jalap, and the Percentage Strength of Commercial Samples.*
L. G. Ketchum, New York, *Secundem Artem.*
C G. Koehler, New York, *The Natural Order Compositæ.*
J B. Kunath, Germany, *Senna.*
Daniel Leibe, New Jersey, *Arsenic.*
E. N. Liell, New York, *On the Principal Constituents of Digitalis purpurea.*
F. W. Luerssen, Germany, *Iodine and its Preparations.*
Silas McIver, Georgia, *Dialyzed Iron.*
Joseph McMahon, New York, *Liq. Ferri Chloridi and Ung. Hydrarg. Nitr.*
John Metzger, Long Island, *The Atomic Theory.*
R. C. Miot, South Carolina, *Gelsemium sempervirens.*
Silas H. Moore, Vermont, *Plant Life and its Relations to the Animal Kingdom.*
A. J More, Pennsylvania, *Damiana: an Investigation of the Commercial Variety.*
William H. Muller, Germany, *Volatile Oils: their Composition, Adulterations and Modes for Detecting them*
Charles Potberg, Pennsylvania, *Benzoinum.*
C. E Reynolds, Ohio, *Strychnos Nux Vomica.*
Richard J. Reynolds, New Jersey, *Elegant New Pharmaceutical Preparations.*
W. F. Riecker, New York, *Eucalyptus globulus.*
Edward Roth, New York, *Urine and Some of its Constituents.*
J. W. Schelpert, Georgia, *Glycerin.*
L. J Schlesinger, Virginia, *Sugar from Sugar Cane.*
W. H H Schofield, New York, *Iodine and Potassic Iodide.*
George Schreyer New York, *Starch.*
W. A. Smith, New Jersey, *Digitalis purpurea.*
A. T. Snelling, Virginia, *The Preparation of Fluid Extract of Ipecacuanha and Emetia.*
A. F. Stevenson, New York, *Jalap and its Resin.*
Louis Thurn, New York, *Iron and its Officinal Preparations.*
A. G. Uber, Illinois, *By-products of Gas industry.*
R Vandenhenden, Belgium, *Theory of Nitrification.*
W. M. Walker, New York, *Pharmaceutical Advancement and the Public.*
Paul Weber, Germany, *Observations from the Pharmaceutical Laboratory.*
Louis F. Weismann, New York, *Humulus lupulus and its Officinal Preparations.*
John Wimmer, New York, *Detection and Isolation of Arsenic in Organic Matter.*

The Commencement exercises were held in Chickering Hall, on the evening of March 19th. The degrees were conferred by the President, Ewen [illegible] the Alumni prizes (consisting of a gold, silver and a bronze medal) [illegible] through Mr B. F McIntyre, to G. D. Hayes, Silas H. Moore and [illegible], Jr. An address was delivered by Prof. R. W Raymond, and in behalf of the graduating class by R. Robeson. The class presented to the College a spectroscope, which was received by Prof. Bedford.

Later in the evening the officers of the College and invited guests assembled socially and had a pleasant reunion. The supper over, a number of toasts were proposed and responded to.

Alumni Association of the College of Pharmacy of the City of New York.—The Annual Meeting was held Thursday evening, March 14th, in the University building.

The following officers were chosen for the ensuing year: President, Starr H.

Ambler; Vice Presidents, B. F. McIntyre, J. L. A. Creuse, B. F. Hays; Treasurer, Theobald Frohwein; Secretary, H. L. Coit; Registrar, L. M. Royce; Delegates to the Twenty-sixth Annual Meeting of the American Pharmaceutical Association, P. W. Bedford, Theo. Frohwein, Starr H. Ambler, B. F. Hays, E. Montanus.

At 10 o'clock, the members and invited guests proceeded to the Sinclair House, and gave a collation in honor of the graduating class of 1878, at which, with toasts and speeches, a few hours were pleasantly spent, B. F. McIntyre, the retiring President, presiding.

Alumni Association of the St. Louis College of Pharmacy.—The third annual meeting was held at the lecture-room of the College on the evening of February 19, President Lindeman in the chair. Present twenty-four members. The minutes of the last annual meeting and of the Executive Board were read and approved. The annual reports of the president, officers and committees were read and acted upon, the Treasurer reporting a balance on hand amounting to $115.25. The election of officers for the ensuing year resulted as follows: Francis Hemm, President; Henry Strassinger and O. E. Trentler, Vice Presidents; W. C. Bolm, Recording Secretary; R. H. B. Hunstock, Corresponding Secretary; Ad. Pfeiffer, Treasurer; C. A. Bendel, Registrar; H. E. Lindeman, Chas. Geitner and F. F. Reichenbach, members of the Executive Board. The newly-elected president appointed a committee of five to suggest amendments to the Pharmacy Act of St. Louis, which, as it stands at present, was pronounced in the retiring president's address as being very impotent and almost useless.

Pharmaceutical Society of Great Britain.—At the pharmaceutical meeting, held Feb. 6, President John Williams in the chair, Prof. Bentley exhibited some *Chinese opium* and the poppy capsule from which it had been prepared. It appears that in China the capsules are not incised but punctured, and after a day, or a day and a half, the opium is scraped off and put into jars; it seems to be generally quite moist and often of a musty odor. Some specimens of Chinese opium had been found to contain as much as 15 to 17 per cent. of morphia; the specimen, examined by Mr. Thirlby, had yielded 7·75 per cent of morphia and 6·75 per cent of narcotina. Prof. Bentley considers Chinese opium altogether inferior to Smyrna opium.

Prof. Bentley also showed *matura flowers*, which, on a superficial examination, resemble fruits, but are really the corollas of *Bassia latifolia*, a tree common in India, in some parts of which they are used for food. They have a saccharine smell and contain a large quantity of sugar. A spirit may be obtained from them, which, when new, is regarded as injurious, and there appears to be a difficulty in freeing it from its disagreeable qualities; but when it is old it is said to get better. Several tons of the flowers are now coming into the English market to be used in distillation.

Prof. C. H. Wood, of Calcutta, read a paper on the *progress of cinchona cultivation and alkaloid production in Bengal.* The cultivation was commenced in 1861, by Dr. Anderson at the botanical gardens at Calcutta, and in the following year preparations were commenced for establishing a permanent plantation in Sikkim, on

the slopes of the Himalayas. The first patch of 500 cinchonas was planted in 1864, in the valley of Rungbee, 12 miles distant from Darjeeling; at present the total number of cinchona trees is 3,000,000, covering about 1,900 acres. Of the species experimented with *C. Pahudiana* was proved to be comparatively worthless; *C. officinalis* and *Pitayensis* will not thrive under the climatic conditions of Sikkim, and *C. Micrantha* yields a bark rich in cinchonia only; their cultivation has been abandoned. *C. Calisaya* grows under rather limited conditions, is more difficult to propagate and has a tendency to run into varieties which do not furnish bark of equal value. Its cultivation has not made the same progress as that of *C. succirubra*, which has proved a decided success; the tree is hardy, growing well under a sufficiently wide range of conditions, seeds freely, is easily propagated and has little disposition to run into varieties. There are now about 2,500,000 of these trees in cultivation, and if regularly cut at the end of their seventh or eighth year (a corresponding number being at the same time planted out), it is estimated, would yield annually 366,000 lbs. of bark, the yield from each tree varying between 6 oz. and 6 lbs. (exclusive of the rootbark which is richest in alkaloids). The bark crop is taken by coppicing (cutting the tree close to the ground) or by uprooting; the experiments on the most advantageous plan of harvesting are not yet concluded.

The average yield of the plantations contains 4 to 5 per cent. of total alkaloids, the average composition of which is quinia, 16·31, cinchonidia, 30·53, cinchonia, 35·26 and amorphous alkaloid, 17·90 per cent. The mixed alkaloids are obtained by exhausting the bark with dilute hydrochloric acid, precipitating with soda, redissolving in just sufficient dilute acid, filtering from coloring matter and again precipitating; the dried precipitate yields a white powder, acquiring a slight buff tint by keeping; it never agglutinates and is readily soluble in weak acids. It is used under the name of *cinchona febrifuge*, and is not intended as a substitute for quinia but a supplement to it, useful in the fever prevalent among the natives of India. It is now manufactured at the rate of 4,000 lbs. per year, the cost price being one rupee per ounce (1s. 9d).

Dr. De Vrij alluded to the rapidly-growing *Cinch. pubescens*, the bark of which is very rich in quinia, yielding on the first renewal by McIvor's mossing process 9 per cent. of total alkaloids, furnishing 7·2 per cent. of quinia sulphate. The Quinological Congress, held last April in Amsterdam, had decided that that process was the future of cinchona cultivation. In his experience coppicing always yielded a poorer bark than that produced by renewal. He criticised a statement by Surgeon-General Smith in regard to the insolubility of the mixed alkaloids in dilute muriatic acid, proposed for this cinchona febrifuge the name of *quinetum*, and referred to experiments made by Prof. Binz of Bonn, according to which the amorphous alkaloid is much more toxic than quinia.

Messrs. Moss and Wood objected to the word "quinetum," which meant a collection of cinchona trees rather than of its alkaloids.

Dr. Paul referred to the difference in composition which the cinchona febrifuge must necessarily have, and said that whatever might be the advantage of using up the bark in the preparation of that substance, it was still a question whether it wuold

be possible for the latter to stand against the preparations of the pure alkaloids as offered in the market.

Mr. Wood stated that the process of mossing had failed in Bengal, the new bark being destroyed by ants and other insects; the economy of the process should likewise be taken into consideration. The bark produced at Darjeeling was valuable and very cheap, and, from the observations made, it could be claimed that in a little time Bengal would be able to produce barks equal to the *Cinch. pubescens.*

Paris Pharmaceutical Society.—At the session, held January 9, Mr. Méhu presiding, Messrs. Schaeuffèle, Lefort, Desnoix, Marais, Duquesnel and Petit were appointed a permanent committee, for the purpose of examining all propositions concerning new medicaments or new formulas, and reporting the results to the Society.

Mr. Stan. Martin presented a specimen of *Cremocarpus setigerus* of California. It belongs to the Euphorbiaceæ, resembles a croton, and, with water, yields a distillate having a goat-like odor; sulphide of carbon takes up a brown fat, having the same odor, and alcohol a hygroscopic extractive of an acrid and very irritating taste.

Mr. Petit presented *acid bromhydrates of quinia* and *quinidia*, which consist of 4 equiv. of water, 2 of acid and one of base. He also reported on commercial neutral *sulphate of quinidia*, of which he had examined a sample from London and one from Val-de-Grâce; both showed the same rotatory power, and lost at 100°C. not over 0·5 per cent. of moisture; the salt seems, therefore, not to contain any water of crystallization.

EDITORIAL DEPARTMENT.

Synonyms.—On p. 143 of our last number, we referred to a "curious synonym for quinia." In a communication to the "Medical and Surgical Reporter," March 16, Dr. I. Gilbert Young quotes our editorial remarks, with the (undoubtedly accidental) addition of the word *was* in the sentence: "The patient (*was*) imagined to be unable, etc.," thereby changing its meaning. But what we particularly desire to call attention to are the following remarks in Dr. Young's communication:

> From my earliest professional days, however, I have (as doubtless most practitioners likewise), encountered a deep, constantly met with, and causeless prejudice to the use of the preparation of Peruvian bark in question. With the view, then, of nullifying, as far as possible, the annoyance resulting from such prejudice, I early adopted, as a synonym for quinia, the caption of this article, "Sulphas Americana Australis," and by having it understood by the druggists of my neighborhood, have not only succeeded in puzzling such of my patients as insist on reading my prescriptions, but have also secured to them the beneficent results accruing from the taking of this most valuable "South American Sulphate." Whether the general adoption of some such synonym is expedient or necessary at present is respectfully submitted. Of one fact, however, the writer is certain: it has done good service in many cases, for him.

Most pharmacists, undoubtedly, have been as much annoyed, as most physicians have been, by the refusal of patients to have prescriptions put up on finding them to contain an article which, for some reason or other, they were reluctant to take. In such cases well recognized synonyms become of importance. In our opinion too

little attention has been paid thereto by both physicians and pharmacists, and the subject has been completely neglected by the Pharmacopœia, while several foreign Pharmacopœias give to some old names the official sanction as synonyms, thus: Pharm. Germ. recognizes Opium also as *Meconium* and *Laudanum*; Tinctura Opii as *Tinct. thebaica* and *Tinct. Meconii*, etc. It would not be necessary to unearth all the ancient names, but the recognition of one or two synonyms for the most important articles with which the difficulties alluded to have been experienced (quinia is one of these) would prevent that annoyance altogether.

The Western Druggists' Mutual Benefit Association, is the title of an Association, which was incorporated in the State of Ohio about eight months ago. From the charter and by-laws before us, we learn that its objects are the insurance of the lives of its members for the benefit of their heirs. Persons engaged in dealing or manufacturing articles pertaining to the drug trade are eligible to membership, and pay an entrance fee, graduated according to their age. $1 25 assessment is paid in anticipation of a death. All funds are securely invested, and, on the death of a member, his heirs receive a sum equal to one dollar for each member, but not exceeding $5,000. The balance is used for defraying the necessary expenses, the only salaried officer being the Secretary, and the surplus is allowed to accumulate until it exceeds by $3,000 the amount of a death loss, when the latter will be paid from the Treasury in place of making an assessment.

The present Trustees are members of prominent firms of Cincinnati, and as to the plan, that appears to speak for itself, combining economy of management with all the advantages that may be expected to accrue from a mutual benefit organization.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Jahresbericht über die Fortschritte der Pharmacognosie, Pharmacie und Toxicologie. Herausgegeben von Dr. Dragendorff, Professor der Pharmacie in Dorpat. Neue Folge. 11. Jahrgang, 1876. Göttingen, Vandenhoeck & Ruprecht's Verlag, 1877. 8vo, pp. 682.

Annual Report on the Progress of Pharmacognosy, Pharmacy and Toxicology. For the year 1876.

The general arrangement of this annual remains as in former years; it opens with an enumeration of the pharmaceutical literature, giving the titles of books and pamphlets and new journals relating to pharmacy and allied branches, and a brief review of a number of them. In the second division those essays are considereed which refer to general pharmacy and to the condition of pharmacy in different countries. The third division embraces pharmacognosy, and is subdivided in drugs from the vegetable and animal kingdom. Pharmaceutical chemistry is the subject of the fourth and pharmaceutical preparations of the fifth division, the latter with an appendix giving the composition of those nostrums the analysis of which was published

in 1876. The publications on toxicology and forensic medicine have been reported on in the sixth division.

The former reports of this work are so favorably known that it is unnecessary to enlarge upon the merits of the volume before us. The abstracts have, as usual, been made with great care; sufficient details are given to enable the reader to work by or identify the bodies treated of, references being frequently made to reports of former years or to other papers published in the same volume, the consultation of which is very much facilitated by the thorough systematic arrangement. Papers which are not suited for abstracts are enumerated, with the source where published, and a general statement of their contents. A good index of authors as well as of subjects likewise renders the report very serviceable.

A Handbook of Volumetric Analysis; designed for the use of Classes in Colleges and Technical Schools. By Edward Hart, S. B., Fellow of Chemistry in the John Hopkins University. New York: John Wiley & Sons, 1870. 12mo, pp. 326. Bound. Price, $2.50

We have been very much pleased in finding this work so well adapted for the use of the student and at the same time as a book for ready reference. It is divided into three parts, Part I being devoted to the instruments, the sources of error, preparation of the solutions and the general methods of volumetric analysis, namely those of saturation, oxidation, reduction and precipitation.

Part II treats of the estimation of the different metals and the non-metallic elements and their compounds. Some special subjects, such as steel, oxygen in water, urine, water and indigo, have been reserved for Part III, though the last subject is scarcely more than alluded to, no details being given.

As far as we have examined it, we have found the descriptions clear and precise, the methods well selected and the illustrations good and characteristic. We have observed little that we would desire to have altered. In some cases, the methods might, perhaps, have been described more in detail, but as they are, they are quite sufficient for those who understand the reactions, and no others should attempt to work by a complicated process. We prefer the term "neutralization," though we know that "saturation" is much more generally employed for the methods depending upon the neutralization of an acid by an alkali, and *vice versa*. On p. 45 it is directed to remove excess of baryta by "Seltzer water"; carbonic acid water, of course, is meant.

Report on Adulteration of Food; being Supplement No. III to the Report of the Department of Inland Revenue. Ottawa: Maclean, Roger & Co., printers, 1878.

This report has been printed by order of the Parliament of the Dominion of Canada. The report itself is brief, giving merely a summary of the results and the proportion of the examined samples adulterated. It shows the value of the law in exposing dishonesty and protecting the consumer, and argues in favor of extending its provisions to the whole Dominion. It is followed by 25 plates, containing 60

figures of microscopic objects illustrating the adulterants used for the adulteration of tobacco and of some articles of food

The appendix contains the various analytical reports more in detail, and arranged in condensed and tabular form.

Taschenbuch der Nahrungs-und Genussmittel-Lehre. Von G. C. Wittstein. Nördlingen: C. H. Beck'sche Buchhandlung: 1878. 12vo, pp. 176.
Compendium of articles of food and drink.

The author, who is well known to our readers not only as an authority in pharmaceutical matters, but likewise as a man who has ever battled against nostrums and adulterations, states upon the title page that the work was intended to take particular cognizance of the deteriorations, impurities and sophistications to which articles of food and drink are subject. The material has been arranged in alphabetical order, and in each case has been given as nearly as possible, 1, the physical and chemical characteristics of the article; 2, the changes and adulterations thus far observed; 3, the recognition of these with the most simple and, at the same time, reliable means, and 4, hints in regard to the proper vessels and means for preserving these articles. The aim was to produce a work for the use of every housewife of ordinary intelligence; but it is obvious that, occasionally at least, processes had to be described which cannot be performed except by the expert. The book is therefore also valuable to the latter, and since in cases of doubt the pharmacist is not unfrequently applied to for his judgment, and since all the spices and many other articles used in the kitchen or for invalids are legitimate pharmaceutical goods, the work before us is likewise of importance to the pharmacist, giving him, in many instances, advice as to how to proceed for determining the purity of articles of everyday consumption, and as such, we recommend it to our readers.

Gmelin-Kraut's Handbuch der Chemie. Anorganische Chemie in drei Bänden. Sechste Auflage. Heidelberg: Carl Winter's Universitäts Buchhandlung, 1877.
Gmelin-Kraut's Handbook of Chemistry. Inorganic Chemistry, in three volumes.

Before us are parts 7 and 8 of the first division, and parts 3 and 4 of the second division of the second volume of the sixth edition of Gmelin's Chemistry. The former contains the conclusion of calcium and a good portion of magnesium; the latter tungsten and molybdenum. The first and third volumes have been completed, so that only the second volume remains to complete this new edition, and, being divided into two parts, one being prepared by Prof. Kraut, the editor of the whole work, the other by Prof. Jörgensen of Kopenhagen, there is a fair prospect that ere long this valuable work will be in the hands of all interested.

Medicinal Plants; being descriptions with original figures of the principal plants employed in medicine, and an account of their properties and uses. By R. Bentley, F.L.S., and H. Trimen, M.B., F.L.S. Philadelphia: Lindsay & Blakiston. 1877. Price per part, $2.00.

Parts 25 and 26 before us, describe the following plants: Abrus præcatorius, *Lin.*

(Indian liquorice); Alstonia scholaris, *R.Br.* (Dita bark); Arctostaphylos uva ursi, *Spreng.*; Berberis aristata, *DC.*; Capsicum annuum, *Lin.*; Calatropis procera, *R.Br.* (Mudar); Cassia fistula, *Lin.*; Coptis trifolia, *Salisb.*; Galipea cusparia, *St. Hil.*; Gynocardia odorata, *R. Br.* (Chaulmugra of India); Hydrastis canadensis, *Lin.*; Nectandra Rodiæi, *Schomb.*; Solenostema argel, *Hayne*, and Veronica (Leptandra *Nutt*) virginica, *Lin.*

First Annual Report of the Commissioners of Pharmacy of the State of Maine, 1877. Augusta: Sprague, Owen and Nash.

This official report gives an account of the proceedings of the board during the first year of its existence, and makes some suggestions for modifications; 1, that a registered pharmacist be forbidden to conduct more than one business by virtue of his certificate; 2, that any person may have an interest in the business, but that it must be conducted by a registered pharmacist; 3, modification of the Maine liquor law so as to permit pharmacists to dispense alcoholic liquids.

Proceedings of the Michigan Pharmaceutical Association as its Fourth Annual Meeting. Detroit, Oct. 17, 1877, 8vo, pp. 39.

Proceedings of the Sixth and Seventh Annual Meetings of the New Jersey Pharmaceutical Association, held in New Brunswick, May 17, 1876, *and Newark, Wednesday May* 16, 1877, with an appendix containing the proceedings of a special meeting, held at Long Branch, August 16, 1871, and the proceedings of the Second Annual Meeting, held at Trenton, Feb. 7, 1872. 8vo, pp. 73.

Proceedings of the Ninth Annual Meeting of the California Pharmaceutical Soeiety, and the Fifth Annual Meeting of the California College of Pharmacy, held at San Francisco, Jan. 10, 1878. 8vo, pp. 42.

The publication of these pamphlets gives evidence of the interest felt in the advancement of pharmacy in the three States mentioned.

The reception of the following pamphlets is hereby acknowledged:

What am I? A valedictory address to the graduates of the Medical Department of the University of Louisville, Feb. 28, 1878. By J. M. Bodine, M.D. Pp. 28.

Proceedings of the Association of Medical Officers of American Institutions for Idiotic and Feebleminded Persons, 1876 *and* 1877. Philadelphia: J. B. Lippincott & Co. Pp. 35.

Belladonna as a Remedy for Collapse. By Reinhard Weber, M.D.

Report on One Hundred and Ten Cases of Extraction of Cataract by Von Graefe's Peripheric Linear Method. By M. Landesberg, M. D.

The last two reprints from Philadelphia "Medical Times."

Correction.—The cut on page 172 has, through the carelessness of the printer, been placed in a wrong position. The plaster being fastened on a table or counter, the perforating tool is necessarily worked *from above*, and the illustration should be turned so that the plaster is at the bottom.